AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Manufactured and Natural Gas

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New Cleveland Stadium Uses UNIT-ORS

Osborn Engineering Company . *Engineers*
Walker & Weeks . . *Associate Architects*
W. J. Schirmer Company, *General Contractors*
Kahn Company . . *Heating Contractors*

In the new Cleveland Stadium... wherever dependable, healthful heat is essential...UNIT-**OR** Gas-Fired Heaters have been installed. UNIT-**ORS** with their attractive finish of either walnut or green Chrystalline will be found in the team rooms, first-aid rooms, officials' rooms, press rooms, groundkeeper's rooms, and the many men's and women's rest rooms.

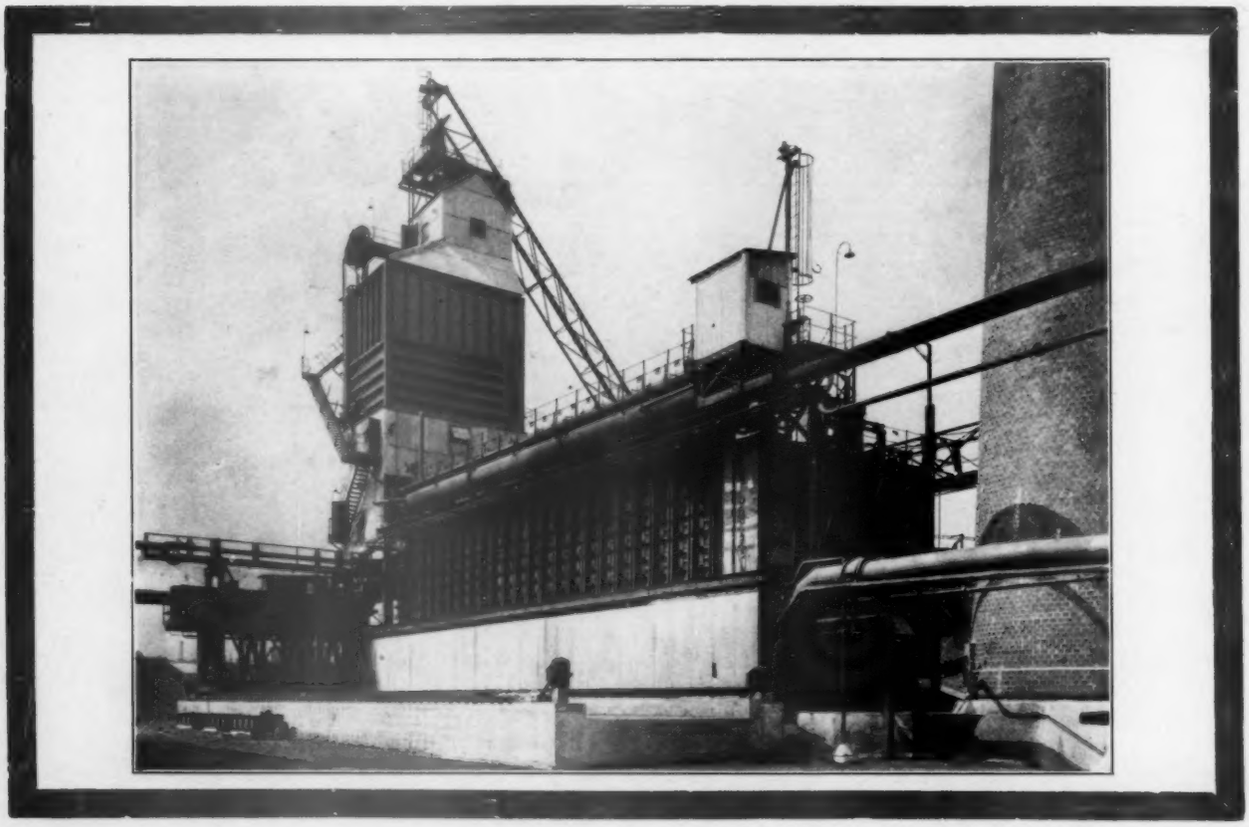
AMERICAN GAS PRODUCTS CORPORATION

CHRYSLER BUILDING
NEW YORK, N. Y.

Green Chrystalline UNIT-**OR** in a corner of one of the team rooms.

Grained walnut UNIT-**OR** is one of the

MODERNIZATION OF BY-PRODUCT COKE PLANTS



•When Koppers plants supplement or partially replace existing equipment, they bring new vigor to the entire coke and gas producing structure. Whether the addition consists of Becker ovens, by-product apparatus, or a material handling plant, its relation to the customer's equipment and business is carefully worked out in terms of current operating and sales practice.

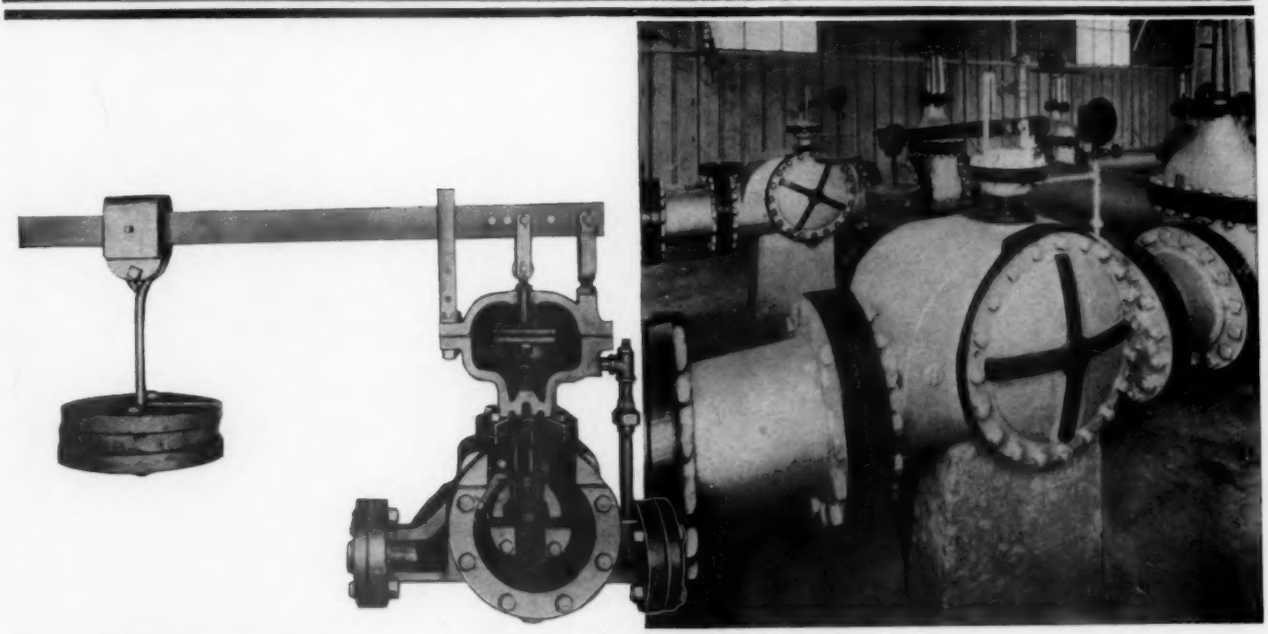
•The result is a unified, revitalized plant that makes new records in production and efficiency.

•Our engineers will be glad to help you consider the application of Koppers plants to your coke and gas requirements.

KOPPERS CONSTRUCTION COMPANY

KOPPERS BUILDING **PITTSBURGH**

FACTS ABOUT EMCO REGULATORS



EMCO Balanced Valve Regulators are . . . .

1. Safe—castings are tested to 100% overload.

2. Accessible—by removing body hand hole plate, valves and valve seats may be readily inspected.

3. Adaptable—interchangeable diaphragm head and valve assemblies make for ideal regulation under any condition of pressure or volume.

4. Sensitive—no external stuffing boxes to bind or leak.

5. Low Maintenance—all parts interchangeable and removable, repairs can be made without removing the regulator from the line.

Pittsburgh Equitable Meter Company

Main Office and Factories—Pittsburgh, Pa.

EMCO METERS AND REGULATORS

U. S. de Lavaud Pipe

HERE'S a pipe that is 25% stronger than pit cast pipe, lighter in weight, more economical to handle and easier to cut and tap.

These are the reasons why, during the past few years, Detroit, Michigan has purchased and laid more than 800 miles of deLavaud Pipe—why within 8 years, American cities have put down over 10,000 miles of deLavaud Pipe.

The deLavaud Handbook gives complete details and specifications. For free copy address United States Pipe and Foundry Co., Burlington, N. J.

Sales offices located in the following cities: New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles.

CAST Q IRON

Our pipe bears the "Q-check" trademark of The Cast Iron Pipe Research Association

Taking the newly cast pipe to the annealing furnace.

AMERICAN
GAS JOURNAL
Established 1859 — *Pioneer of the Gas Industry*

Manufactured and Natural Gas

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H. M. RILEY, *Editor*

R. S. MCBRIDE, *Consulting Editor*, Washington, D. C.

Vol. 135, No. 5 — November, 1931 — Whole Number 3695

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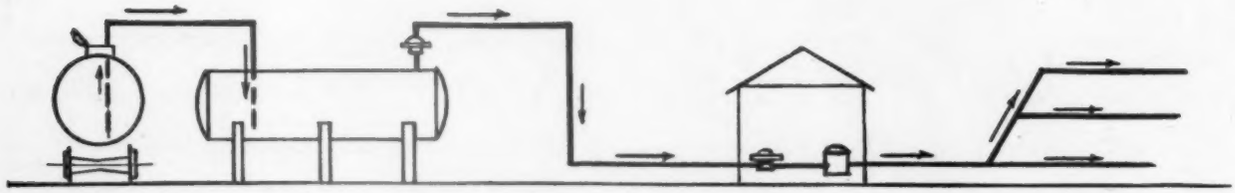
UNDILUTED PROPANE PLANTS . .



a logical solution to the low load-factor problem

There are a vast number of towns without gas service. The profitable extension of service to them is one of the problems confronting the Gas Industry.

In many instances, service mains from natural gas transmission lines are uneconomical due to the low load-factor of such lines. Likewise some of these towns are too small for Butane-air plants.

Undiluted Propane plants are the answer to the problem because of:

1. *Low plant investment*
2. *No power costs*
3. *Minimum labor costs*
4. *Low maintenance*

These plants, in many instances, offer a lower delivered cost per B. T. U. at the burner than is possible by any other method of gas manufacture or distribution.

We will gladly supply additional information.

GAS MANUFACTURING DIVISION

« PHILFUELS COMPANY »

(SUBSIDIARY OF PHILLIPS PETROLEUM COMPANY)

7-101 GENERAL MOTORS BLDG.

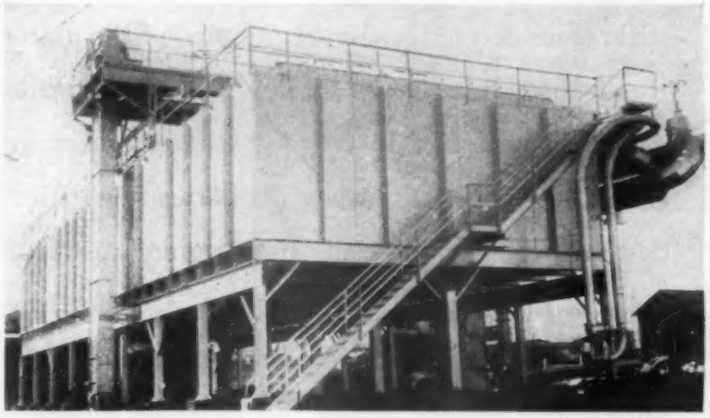
DETROIT MICHIGAN

Endorsed By Gas Engineers Everywhere

Welded Steel Purifiers, first developed by our organization, have won the endorsement of the gas industry all over the continent.

Decks and covers are generously sloped for drainage. All openings have dependable positive seals.

Semet - Solvay Purifiers are built round or rectangular and are elevated for bottom dumping when required. All seams are made rigid, durable and leak-proof by welding both inside and outside.



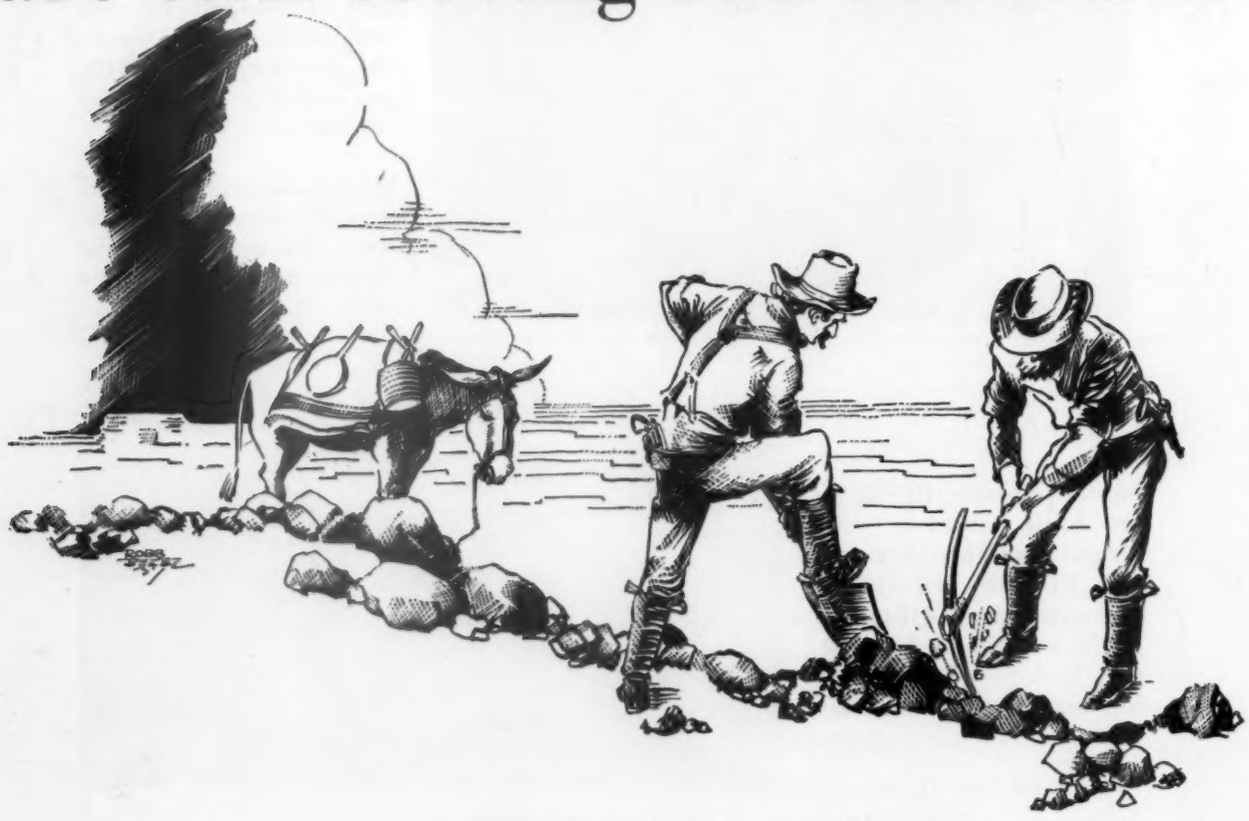
Manifold systems provide for rotating and reversing gas flow. Air piping systems for revivifying oxide in place can be furnished. Trays are built without the use of metal bolts.

We are confident that Semet - Solvay purifying equipment can not be surpassed in economy, satisfaction and low investment cost.

SEMET-SOLVAY ENGINEERING CORPORATION

40 RECTOR STREET NEW YORK, N. Y.

70-year-old Cast Iron Gas Mains are still serving San Francisco



IN 1861 San Francisco laid a cast iron gas main that is still in service. In that day the canyons and arroyos still resounded to the shovel and pick of the placer miner. But nearly thirty years earlier Baltimore, Philadelphia and Louisville had installed cast iron gas mains which are still serving. A survey of 44 leading cities reveals that in over 70 per cent. the original cast iron mains are still on the job. The fact that it is not uncommon to find 70 to 100-year-old cast iron gas mains rendering satisfactory service under the radically changed conditions of today is striking evidence of cast iron's durability and economy. That these sturdy old mains are of remarkable quality must be conceded yet the cast iron pipe available to the gas engineer today is even higher and more uniform in quality.

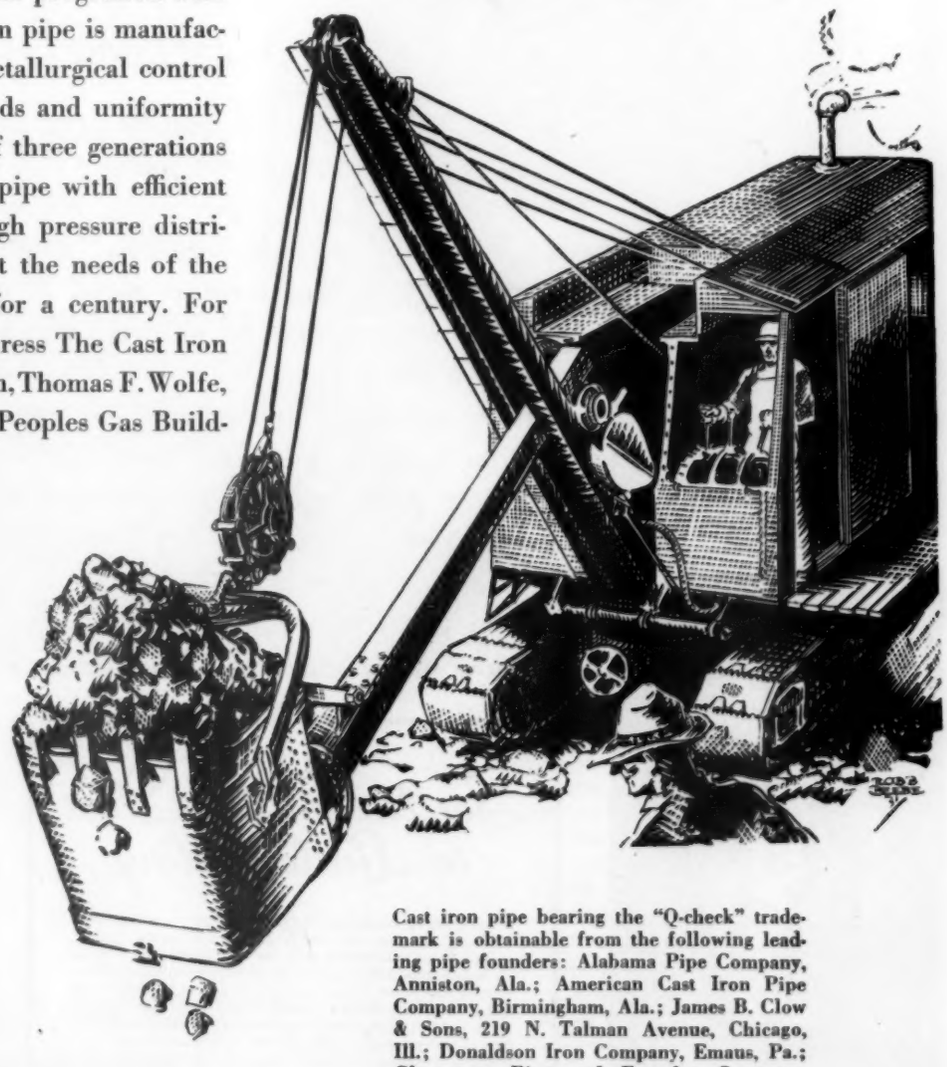
Cast Iron pipe—the best then—is even better today

IN 1931, the hand shovel has long since given way to the giant trench hoe and steam shovel. In common with most industries and engineering practice, the cast iron pressure pipe industry has progressed with the years. Today cast iron pipe is manufactured under scientific metallurgical control and is tested for standards and uniformity by devices undreamed of three generations ago. Modern cast iron pipe with efficient mechanical joints for high pressure distribution continues to meet the needs of the gas industry as it has for a century. For further information, address The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 309 Peoples Gas Building, Chicago, Ill.

Reg. Trade Mark

CAST Q IRON

The "Q-check" symbol shown above is the registered trademark of The Cast Iron Pipe Research Association.



Efficient mechanical joints for cast iron gas mains are now in use and obtainable for high-pressure gas distribution.

Cast iron pipe bearing the "Q-check" trademark is obtainable from the following leading pipe founders: Alabama Pipe Company, Anniston, Ala.; American Cast Iron Pipe Company, Birmingham, Ala.; James B. Clow & Sons, 219 N. Talman Avenue, Chicago, Ill.; Donaldson Iron Company, Emaus, Pa.; Glamorgan Pipe and Foundry Company, Lynchburg, Va.; Lynchburg Foundry Company, Lynchburg, Va.; National Cast Iron Pipe Company, Birmingham, Ala.; United States Pipe and Foundry Company, Burlington, N. J.; Warren Foundry and Pipe Corporation, 11 Broadway, New York.

CAST IRON PIPE

ON THIS LINE EACH WELDER MADE 60 TO 70 WELDS A DAY

ON a Lindewelded natural gas line in Texas, each welder averaged 60 joints a day on 6 5-8 in. pipe, and 70 on 5 1-2 in. pipe.

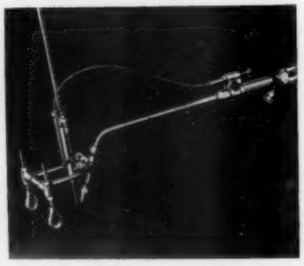
This record is not unusual. Lindewelding with an ordinary blowpipe increases speed 30 to 60 per cent. and lowers consumption of welding materials 35 to 40 per cent. With a special Lindewelder blowpipe, speed is further increased and welding becomes almost automatic.

Pipe lines laid by this new method of oxy-acetylene welding pass every test. Lindewelds are permanently strong and tight.

Procedure Controls for Lindewelding are available to all Linde customers through Linde Process Service. Consult our nearest district office for complete information.

See the Actual Steps in Lindewelding

Lindewelding technique differs from the neutral flame welding technique in that it employs a special rod, a special flame adjustment, and the "backhand" method of blowpipe manipulation. Our motion picture, "The Lindeweld Process for Pipe Line Construction," reveals the actual steps in making a Lindewelded joint. This picture, furnished in 16 mm. and 35 mm. safety film, will be loaned free of charge to pipe line officials and welding or engineering societies. You can obtain it by writing to any Linde District Office.



THE LINDEWELDER

A special appliance which further increases the speed of Lindewelding, and makes the welding operation almost automatic.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

126 Producing Plants UCC 627 Warehouse Stocks

IN CANADA, DOMINION OXYGEN COMPANY, LTD., TORONTO

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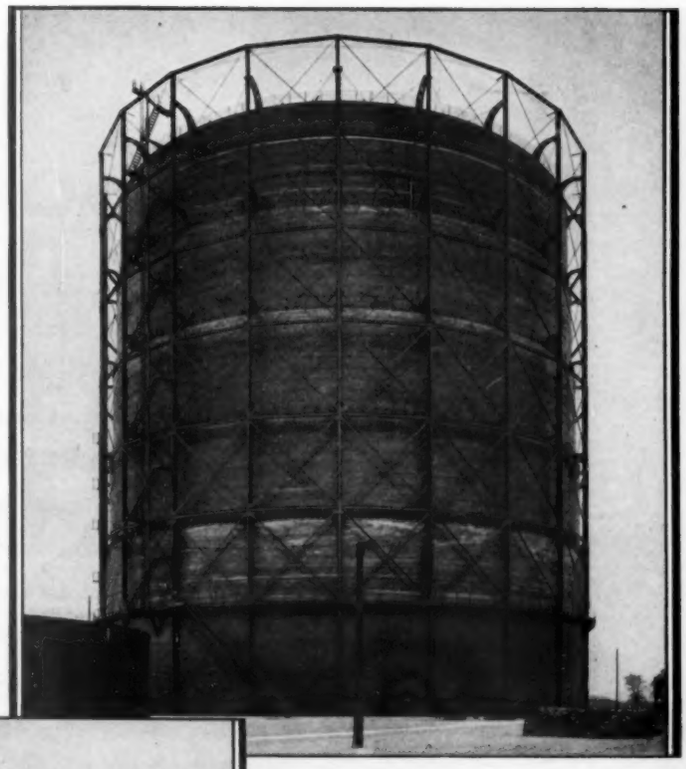
Denver	Minneapolis	Tulsa

LINDE OXYGEN · PREST-O-LITE ACETYLENE · OXWELD APPARATUS AND SUPPLIES · UNION CARBIDE



These Gas Holders do more than hold GAS . . .

They conserve MONEY!

It goes almost without saying that the purchaser of a Gas Holder—whether the unit be built today or five years from today—must judge the unit in accordance with the average total cost per year.

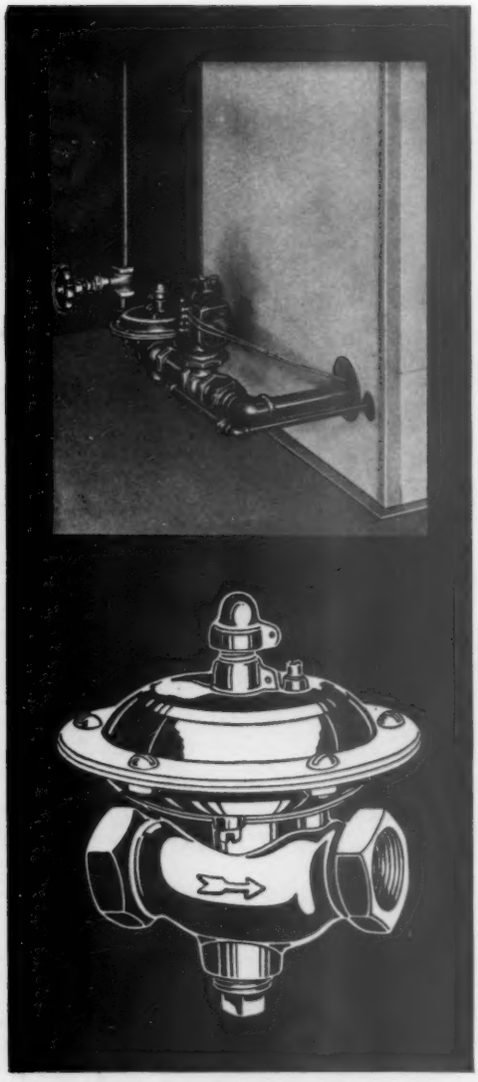
He must take not only first cost into account, but also low upkeep and trouble-free operation. He must select the builder and be gratified in his choice only when all costs have been considered.

Cruse-Kemper engineering aims at lowest ultimate annual outlay for the purchaser. Our fabricating and erecting equipment is so designed, our use of that equipment is so studied, that maximum quality in the job assures minimum yearly expense.

Manufacturers of GAS HOLDERS and other major equipment units for the GAS INDUSTRY.

CRUSE-KEMPER CO.

AMBLER, PA.



Top illustration shows REYNOLDS Low Pressure furnace installation. Below, illustration of Low Pressure Regulator.

Controlled!

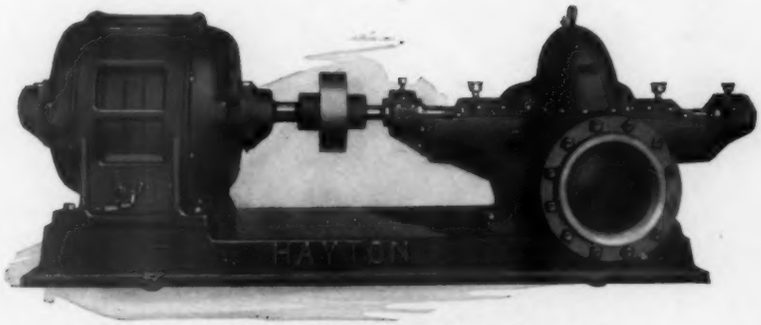
We use the past tense because the Low Pressure Gas installations that have Reynolds Units doing the work are controlled. You will find that one of the most important things about REYNOLDS Low Pressure Regulators is—they keep small volume delivery pressure uniform even if the line pressure varies. It's just plain economy to buy gas regulators that give 100% operating performance. On all low pressure installations the volume is small, the pressure low. That's why it is necessary to have rugged, long-lived and sensitive regulators on the job. Investigate REYNOLDS. Their engineers will be glad to help you solve your gas problems.

Write today for your copy of the new Reynolds Low Pressure Catalog (Catalog K, Section 3). It tells you a complete story about Low Pressure Gas Control.

● **REYNOLDS BRANCH OFFICES:**
*422 Dwight Building
KANSAS CITY, MO.
2nd Unit, Santa Fe Bldg.
DALLAS, TEXAS

● **REPRESENTATIVES:**
Eastern Appliance Co.
Boston, Mass.
F. E. Newberry, Avon, N. J.

REYNOLDS GAS REGULATOR CO.
ANDERSON, INDIANA, U. S. A.



Hayton Class A single-stage double suction pump.

IN BY-PRODUCT COKE PLANTS

HAYTON centrifugal pumps, due to the superiority of the open impeller design and construction, are particularly adapted to handling by-products of coking plants—wash oils, straw oils, ammonia, liquors, benzine, benzol, toluene and tar.

Correct hydraulic balancing of the impeller . . . liberal proportioning of the passageways . . . elimination of wearing rings and end thrust are a few of the special features that make Hayton centrifugal pumps superior to other types. They offer the maximum in endurance and freedom from constant attention.

Hayton pumps are manufactured in all sizes, both single and multi-stage, and in various types to meet any pumping requirement.

Send for pump information dealing with your particular requirements.

(HAYTON PUMP & BLOWER DEPARTMENT)

ROOTS-CONNERSVILLE-WILBRAHAM

DIVISION OF INTERNATIONAL-STACEY CORPORATION

12th Street & Columbia Avenue

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New York Pittsburgh Columbus Chicago Detroit St. Louis Wichita
Tulsa Ft. Worth Houston Beaumont Shreveport Los Angeles Buenos Aires, Argentina

THE

Lux

LUX MATERIAL

BULK (UNMIXED)

Shipments from:— Boston, New York, Philadelphia, Baltimore, Mobile, New Orleans.

LUX SPONGE

Shipments from our own Lux Sponge Plants in Philadelphia and Chicago.

MATERIAL

CHICAGO OFFICE:
343 SO. DEARBORN ST.
PHILADELPHIA OFFICE:
2767 GAUL ST.

THE ALPHA -
192 FRONT STREE

BEST IS THE CHEAPEST—

has proved it!

Lux Gas Purifying Material lasts *three times* longer than others, thus avoiding the loss of gas, and the excess of labor of mixing materials due to too frequent filling and emptying of boxes.

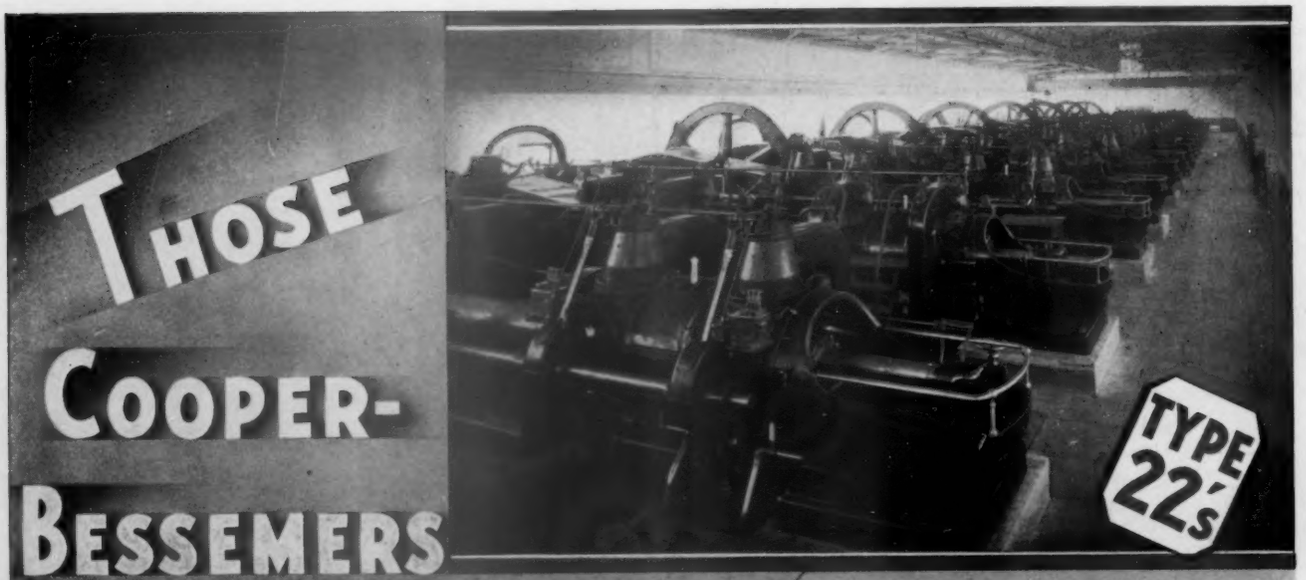
Lux becomes immediately active on entering the boxes, because of its enormous surface area made possible by its scientific preparation.

For smooth, trouble-free, dependable purification and lessened labor costs be sure to specify Lux or Lux sponge.

"LUXIT" H·T·CEMENT

For patching Hot Retorts, Refractory Linings, etc. It is shipped dry in 110 lb. bags, to save freight. Easy to mix--according to our simple directions--and is easy to use. Order sample shipment today!

LUX COMPANY, INC.
NEW YORK CITY, N.Y.



THOSE COOPER-BESSEMERS SURE PUSH THE GAS THROUGH

WHEN the chief engineer and the general superintendent look over a station's monthly report, the first information they want is, "How many million cubic feet of gas did this station push through the line?"

You can expect the figures to be satisfactory—with Cooper-Bessemer Type-22's on the job. For it's the load-handling ability of these 1000 B. H P. gas-engine compressor units that makes them standard for large main-line compressor stations.

"How much did it cost to handle the gas?" is usually the second question. Station men know from experience that these double-acting four-cycle engines do big jobs on a small amount of fuel gas and lubricating oil.

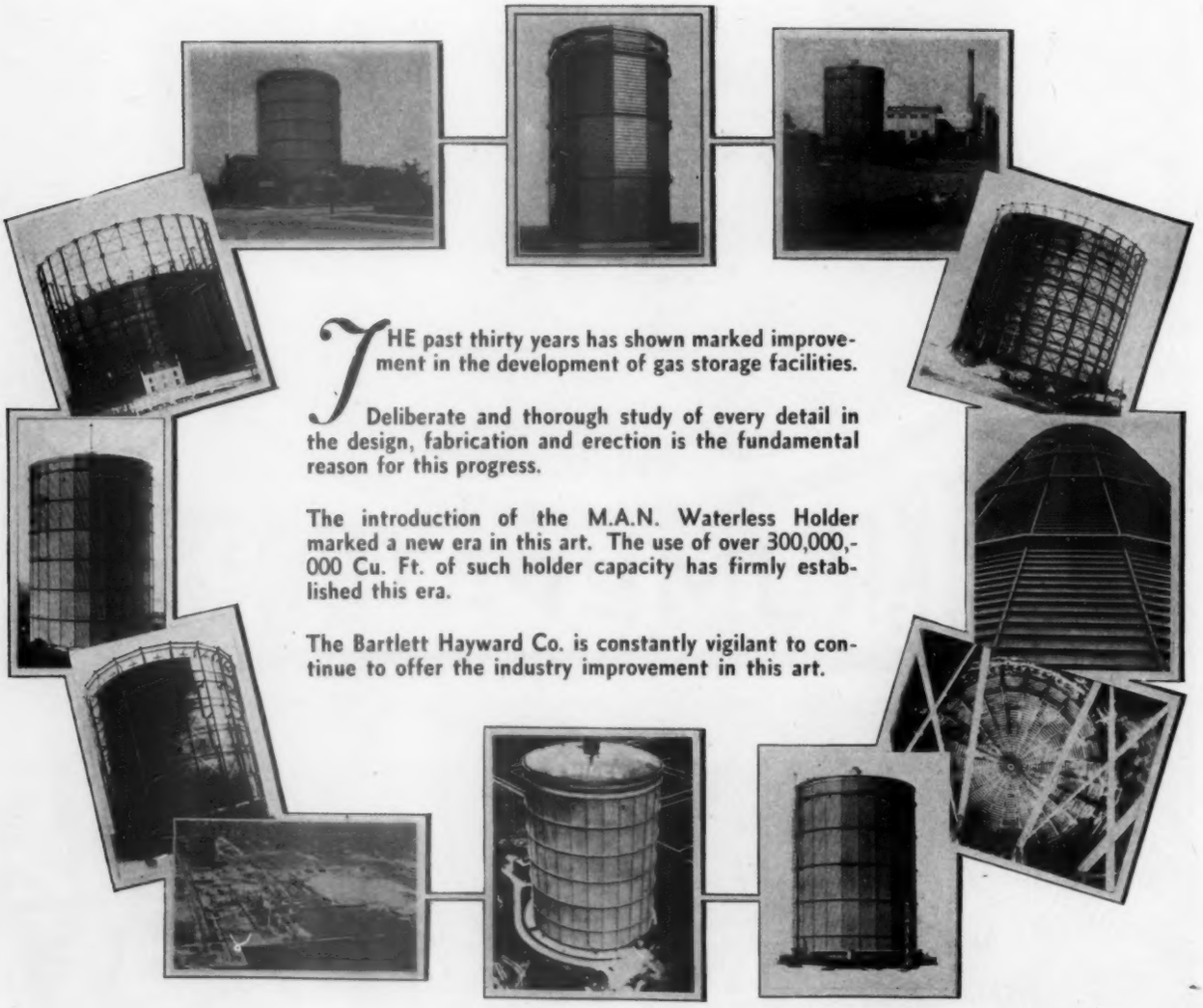
We believe that if you will visit one or two Cooper-Bessemer compressor stations, you will be convinced that Type-22's are the logical units for this service.

COOPER-BESSEMER

THE COOPER-BESSEMER CORPORATION
MOUNT VERNON, OHIO
201 E. First Street
Tulsa, Oklahoma
640 E. 61st St.
Los Angeles, California
GROVE CITY, PENNSYLVANIA
1313 Magnolia Building
Dallas, Texas
Suite No. 501, 25 W. 43rd St.
New York, N. Y.
BRANCH OFFICES IN ALL PRINCIPAL OIL FIELDS

Prolong the Service Life of Your Furnace Linings, by bonding brick with—

This Booklet
tells the "whole story"
—a copy awaits your request



THE past thirty years has shown marked improvement in the development of gas storage facilities.

Deliberate and thorough study of every detail in the design, fabrication and erection is the fundamental reason for this progress.

The introduction of the M.A.N. Waterless Holder marked a new era in this art. The use of over 300,000,000 Cu. Ft. of such holder capacity has firmly established this era.

The Bartlett Hayward Co. is constantly vigilant to continue to offer the industry improvement in this art.

THE

BARTLETT HAYWARD

COMPANY

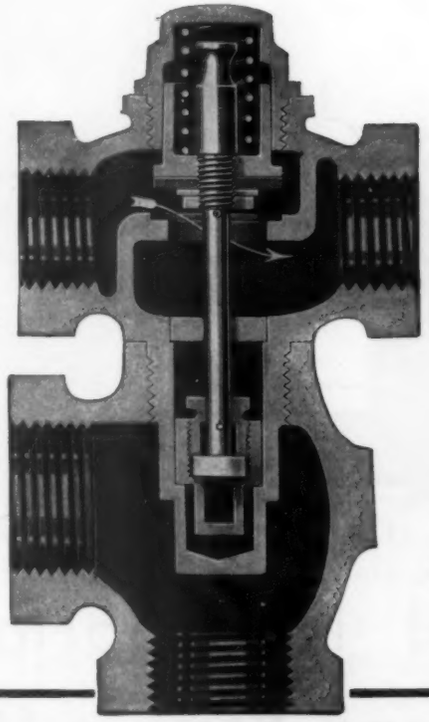
BALTIMORE MARYLAND

Coal Gas, Carburetted Water Gas, Blue Water Gas, By-Product Plants—DeBrouwer Charging and Discharging Machines—Waste Heat Boilers—Purifiers—Condensers—Tar Extractors—Thickening and Filtering Equipment—Feld Scrubbers—Fast's Couplings—Tanks—Gas Holders

GAS COMPANIES REALIZE THE DANGER OF UNCONTROLLED TEMPERATURES . . .

Note this Extract from WATER HEATING, 1930 Edition, pages 78 and 79, published by A.G.A.

"The most satisfactory type of valve now available for gas water heating systems . . . This form of temperature relief valve is deserving of widespread application wherever a gas water heater or an oil water heater is used."



"It performs the function of a satisfactory safeguard without the loss of water, and at the same time it conserves fuel."

The first and only POSITIVE safety device for gas water heaters—an ABSOLUTE PREVENTIVE of excessive water temperatures—adopted by 29 operating gas companies in a single year.

LOVEKIN

EMERGENCY GAS SHUT-OFF VALVE

FOR FULL INFORMATION, INCLUDING PRICES, FILL OUT AND MAIL THIS COUPON

KITSON COMPANY, Sole Manufacturers
261 North Broad Street, Philadelphia

☐ *Please send information on the* LOVEKIN VALVE
☐ *Please send a* LOVEKIN VALVE, *without cost, for test purposes*

Name_____

Address_____

Official Capacity_____

Every Detail is Important

in assuring Long Service Life

For Ironcase Meters

To the high accuracy of Ironcase Meters is also added long service life. In assuring this every detail of construction is important.

For instance, in the casing a selected grey iron is used. This will, of itself, resist for a long period any damage from the corrosive action of injurious gas constituents. But for double protection a special Bakelite coating — scientifically applied by skilled operators to the inside and outside of every case — is added. Even the beginning of corrosion is thus effectively prevented.

This process of case treatment was adopted about two years ago. The closest observation has proved conclusively that it is superior to any other.

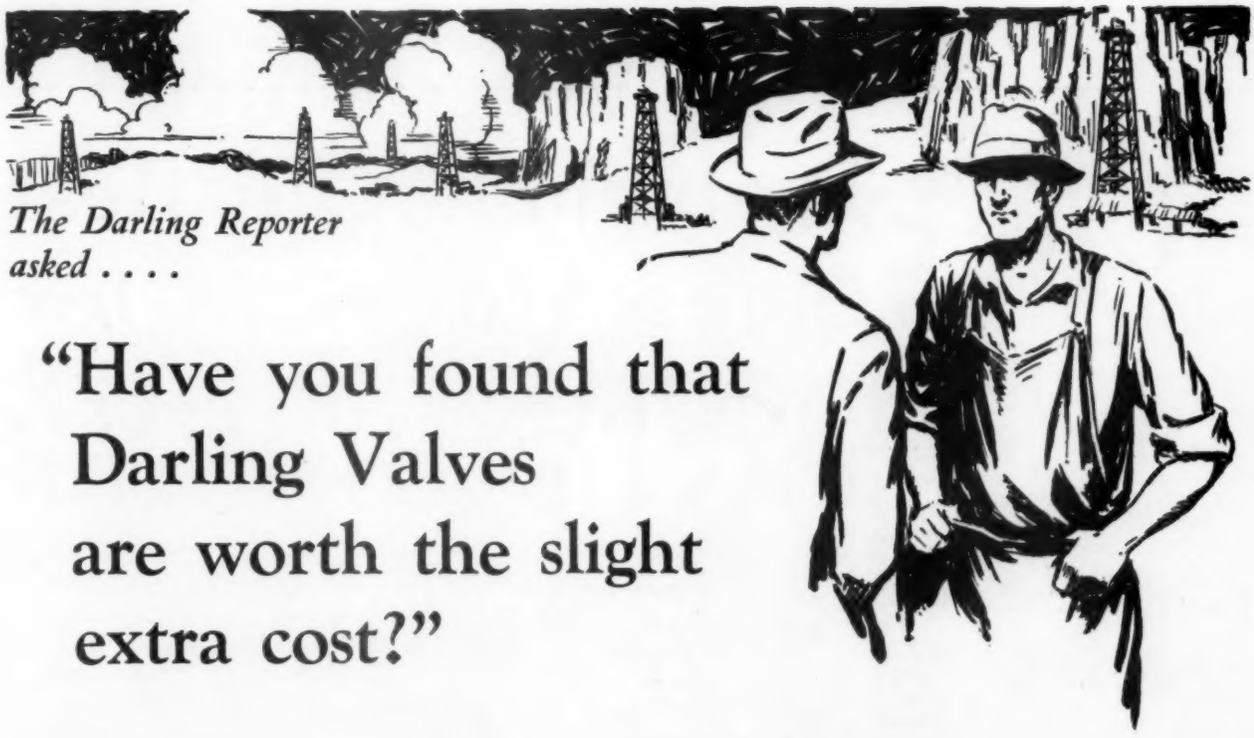
Full information concerning this and the other features that assure long life and accuracy for Ironcase Meters will be mailed upon request.

AMERICAN METER CO. MEASUREMENT ENGINEERS CUBIC FEET

METRIC METAL WORKS
ERIE, PENNSYLVANIA
Ironcase, Tinned Steel Case and Orifice Meters

AMERICAN METER COMPANY
INCORPORATED
The World's Largest Manufacturers of Gas Meters and Allied Apparatus
ESTABLISHED 1836

SALES · ALBANY · BALTIMORE · BIRMINGHAM · BOSTON · CHICAGO · DALLAS · DENVER · ERIE
SERVICE · HOUSTON · KANSAS CITY · LOS ANGELES · NEW YORK · PHILADELPHIA · PITTSBURGH · SAN FRANCISCO · TULSA



The Darling Reporter asked . . . .

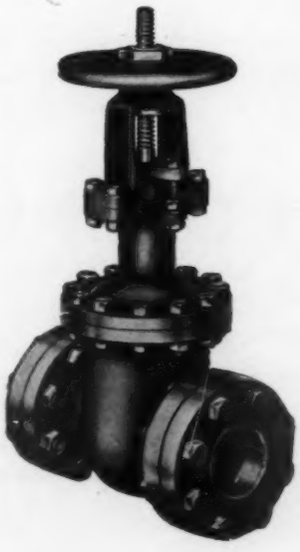
"Have you found that Darling Valves are worth the slight extra cost?"

"You bet! But we were a bit doubtful before we actually tried them. Naturally we want the best we can get for the least money. Though Darlings do cost a bit more, we find them more than worth the difference in the long run."

Darling Valves are constructed on sound Mechanical principles, with an exclusive feature that insures long and satisfactory service—parallel seats and revolving gate discs that seat in a different place each time the valve is closed.

The exceptional quality of the metals used in Darling Valve construction and Dar-a-loy bronze trimmings—the exacting workmanship, inspections and tests—all contribute to the unusual performance of Darling Valves.

At your request, we'll gladly send you complete information.



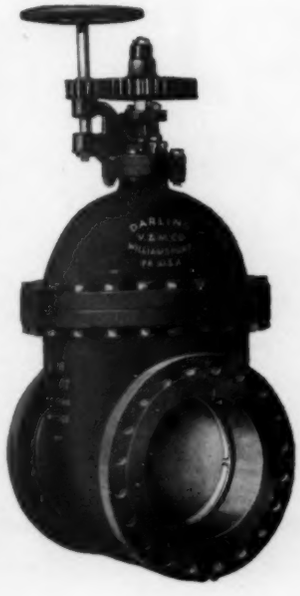
Darling Outside Screw and Yoke Semi-Steel Flanged End Gate Valve with companion flanges bolted on. Dar-a-loy trimmed.

DARLING GATE VALVES

Darling Valve & Mfg. Co.

WILLIAMSPORT, PA.

NEW YORK OKLAHOMA CITY HOUSTON

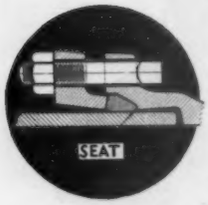


Darval Semi-Steel Gate Valve, Dar-a-loy trimmed — for natural gas pipe lines and compressor stations.

Your Unaccounted for *Gas* Problem Is Our Best Sales Argument for DOUBLEX SIMPLEX CAST IRON PIPE

(Left) Unaccounted-for gas loss will never trouble this western gas company which is installing 12 and 16-inch Doublex Simplex Cast Iron Pipe in its urban lines. It's costly enough to have to tear up pavement to make the initial installation; therefore Doublex Simplex Cast Iron Pipe is being installed to prevent repetition of this expense.

TIME and again you find us stressing certain facts about Doublex Simplex Cast Iron Pipe . . . its extraordinary resistance to destruction by corrosion . . . its strength properties, with consequent ability to carry high gas pressures; and the Doublex Simplex Joint . . . its ability to carry high gas pressures while allowing maximum deflection and longitudinal expansion and contraction without leaking . . . its simplicity, with resultant laying economies . . . its long leakproof life, due to certain inherent gasket-compression characteristics. But the all-important feature of Doublex Simplex Cast Iron Pipe is that it banishes forever the bogie of unaccounted-for gas loss so far as the future is concerned. Write nearest Acipco office for your copy of our catalog "Doublex Simplex Cast Iron Pipe" and for details, quotations, etc., on your next job.



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Rubber under compression retains its "life." Design of the Doublex Simplex Joint includes a positive "seat" which acts to confine the gasket, reducing "flow" of the rubber and resulting in maximum compression area—which is used to grip the surfaces of the pipe and make a bottle-tight joint while the large cross-section of the gasket allows for ample deflection and longitudinal expansion and contraction in the line. Yet the whole joint is so simple that unskilled labor can assemble it with a single tool—a ratchet wrench! Number of bolts varies from 4 to 16, depending on size of pipe.

AMERICAN CAST IRON PIPE COMPANY

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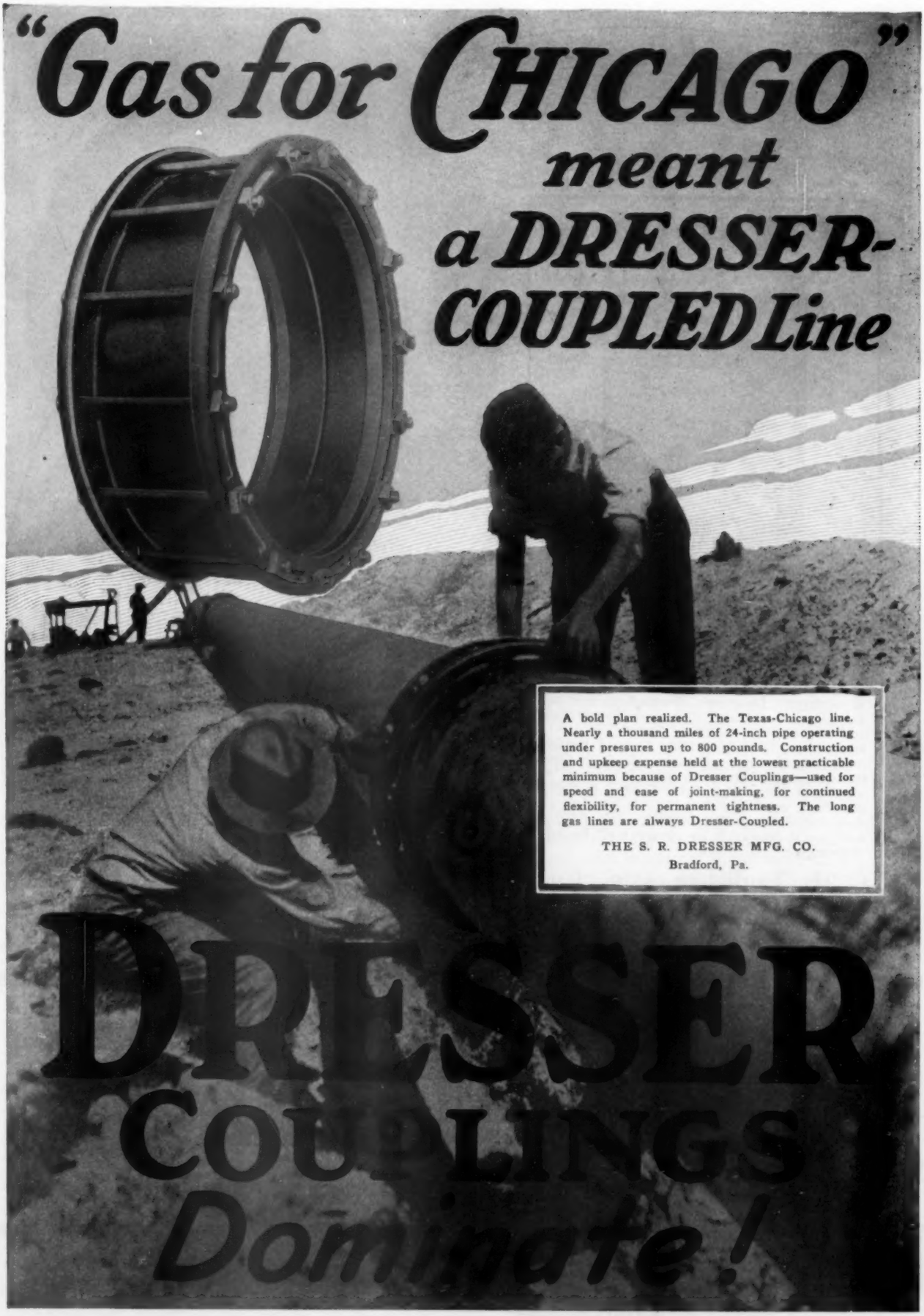
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AMERICAN
GAS JOURNAL
Established 1858 Pioneer of the Gas Industry
Including GAS INDUSTRY Est. 1900

HENRY M. RILEY, *Editor*

Scareproof

DESPITE THE PRESENT status of business there is an altogether uncalled-for lack of purchasing on the part of a vast number of folks who ought to know better. There are entirely too many frayed-out collars in evidence; too abundant a showing of shiny trousers seats, to say nothing of the myriad other commodities that are bought about as freely as salt and razor blades. We refer, of course, to those individuals whose income has been diminished but little or none.

Whence comes this deplorable state of affairs? The answer is,—from sheer fright. We have hit bottom as far as being scared is concerned. Like the rabbit at the first intimation of danger, we have run into our holes, literally knocking down old women and children in arms in our precipitous flight. The malady perforce has communicated itself to trade associations, so that we find a number of them, who also should know better, holding meetings and conventions with an attendance far below the average. Purely another case of the rabbit act.

A cursory review of the recent American Gas Association Convention reveals none of the above mentioned morbid symptoms. Some of the more timorous of us might be inclined to view the meeting as *just another gathering* of gas men that was well attended and quite worthwhile, all things considered. It was another meeting; it was well attended; it was productive of worthwhile ideas but, it was vastly more than these. It was a vibrant demonstration that here was an industry that was not seized in the paralyzing grip of fright —we just wouldn't scare. We turned out en masse and carried on just as though business in general was going along on an even keel.

As might have been expected, we lived up to the best traditions of our industry which has behind it over a century of solving difficult problems and overcoming trying situations. Our convention revealed that we are still planning ahead with imagination and vigor, to the end that Amercan home life and business enterprises will be bettered.

We have done our bit to remove the patches from the country's business breeches by way of the convention. We have demonstrated that we are eminently scareproof. May a smite, at least, of this spirit help to light the way to happier times.

NOV 16 1931

A Heartening Meeting

American Gas Association Convention at Atlantic City Challenges Business Gloom by way of a large attendance, fine addresses and a splendid exhibit

SOMETHING over five thousand gas men were on hand at the recent convention of American Gas Association and thereby infused themselves with the type of optimism so necessary in these troublous times. Pre-convention speculation pointed to a meeting considerably below average, especially insofar as attendance is concerned, and the opening day furnished but little to belie such predictions. However, as the meeting got under way gas men from the four quarters of the country began to pour in until even the most pessimistic had to admit that the industry had more than made the grade. As a matter of fact, this attendance of slightly over five thousand is the second best since the Association has been in existence.

To their credit it must be said that the various manufacturers of appliances and equipment contributed splendidly to the success of the convention. Their wares were not only attractively exhibited but what is more important, also showed that they are keeping step with the progress of the gas industry. Indications also point to the fact that the exhibits were whole heartedly patronized by the gas company delegates.

Aside from touching upon matters of prime importance to the betterment of the industry the various papers and addresses were so scheduled that the gas men could have ample time to inspect the exhibits.

A varied programme of high grade entertainment was furnished and, at the big gathering on Wednesday evening, President Paige's voice was heard by literally millions over a broadcasting network. Incidentally, a somewhat international air was given the meeting due to the presence of several guests from foreign countries. These included Hideo Morioka, Chief Engineer of the Nishi Works, Kobe Gas Company, Kobe, Japan, Sir Francis Goodenough, C. B. E. of London, England, Executive Chairman of the British Commercial Gas Association, and J. Herbert Canning, Newport, Monmouthshire, England, President of the Institution of Gas Engineers. It is of interest to note that these latter two gentlemen contributed largely to the fine reception accorded President Paige and Managing Director Forward during their visit at the First International Gas Conference in London in June of this year.

American Gas Association handled the meeting in excellent fashion and in this regard it is well to note that while some of us might consider the running of such a project as simple, this is far from the mark. All in all it was a fine affair, where old friends exchanged ideas and strengthened the ties of esteem, and the gas industry kept faith with itself.

General Sessions

Paige Outlines Progress

In his address at the first General Session President Clifford E. Paige referred to the success achieved by the "Five-Year Program," concluded this year, and stated that due to the fact that "these principles have stood for the last five years every possible test," a special committee created in January, 1931 would formulate and present a program of Association activities for the next five years. This committee is headed by Mr. D. D. Barnum.

Reviewing the accomplishments of the "Five-Year Program" Mr. Paige brought out that the manufacture and distribution of gas had been greatly bettered. The matter of better utilization was also touched upon. Also the Association's Testing Laboratory came in for merited commendation in the general scheme of affairs.

The promising outlook for air conditioning in homes by the use of gas, the status of gas househeating, the healthy cooperation with plumbers and other outlets for the sale of appliances, the innovation of the therm basis for selling gas and other important features of the gas industry's procedure came in for discussion in Mr. Paige's address. Referring to the splendid team work furnished by the manufacturers he said: "Permit me to state here that the great exhibit staged in this hall by the Manufacturers' Section inspires and arouses the enthusiasm of all members of our industry. This is the largest and most complete exhibit of gas appliances and equipment displayed anywhere, at any time. It represents the faith of our manufacturer members in the future of the gas business, who have backed this faith with large expenditures of time, effort and money. Moreover, it is indicative of the spirit of the industry that prevails during these unusual times."

R. W. Gallagher, President-elect American Gas Association

"If we are a forward looking and forward going industry," said Mr. Paige, "we must justify the faith our stockholders had in spending their money with us. We must extend that faith in order to insure future credit. So first, we have the stockholders' interest. By making our product more available, useful for more purposes, as well as more economical for the consumer, we are contributing toward a substantial public convenience. So our second great incentive to grow is for the good of the community. If we are able to popularize our appliances; if we are able to get consumers interested in what our product will do for them, in either their homes or their factories, we are able to employ more people and offer more good opportunities for advancement. And in these trying times, this is no small contribution to the public welfare. So our third objective is that the promotion of the sale of gas is important because it offers more employment and more opportunity for people, as sales increase.

"We have come to this Convention with feelings of disturbance and uncertainty as to the general business in our country and abroad. We are here, however, confident that whatever may eventuate, our business has withstood magnificently the the assaults made on all industry. We, as an industry have by comparison held our own and indeed have been able to lend some degree of confidence and stability to community life. We have the advantage of being a basic industry, selling a necessity to a people who must have it."

After complimenting Major Forward and his staff for the fine cooperation given him during the past year President Paige concluded with the following optimistic observations:

"While this has been a year of trials and difficulties, we have every reason to look ahead with confidence because over a period of years, the record of this industry has been one of progress. Last year, Mr. Mullaney cautioned us with respect to short range comparisons, and he is right. To enable you to get the proper perspective, let me state that in the last decade, 1920 — 1930 the gas industry added over 4,600,000 customers, an increase of 40%; the sales of gas increased 110%; and revenues of the industry increased 61%. Surely, this is no cause for discouragement.

"With this recital of progress, with our intimate knowledge of the plans for the future, and with the well manned and disciplined organization of this industry, I feel I can confidently say: A UNITED INDUSTRY IS READY—ready for the added responsibilities, ready for the opportunities for enlarged public service, ready to sell more gas."

Encouraging Statistics

The report of Managing Director Forward was concerned for the most part with statistics. These went on to show that during 1930 the revenues of the gas industry amounted to $870,000,000. The number of customers

VISITORS FROM ENGLAND

Left—J. Herbert Canning, Newport, Monmouthshire, England; President, Institution of Gas Engineers

Right—Sir Francis Goodenough, C. B. E., Executive Chairman, British Commercial Gas Association, London, England.

was more than 16,000,000 and the investment in the industry approximated $5,000,000,000.

Referring to natural gas he stated that the consumption in 1930 reached the record figure of one trillion nine hundred and forty-one billion cubic feet. During the same time the sales of manufactured gas aggregated 522,900,000,000 cubic feet, practically the same as for the preceding year. Sales of manufactured gas for househeating increased by almost 28 per cent.

Major Forward went on to show that water gas production had continued to decline in 1930, while retort coal gas had declined by nearly 7 per cent and oil gas had experienced a pronounced drop due to the introduction of natural gas into districts previously served with oil gas.

As regards taxes he said: "Again I call attention to the continued and persistent increase in taxes paid by manufactured gas companies. In 1924 taxes constituted 8.7 per cent of the operating revenues of the industry, whereas by 1930 this rate had risen to 9.6 per cent."

With reference to figures for 1931 he brought out that, "a decrease of only 7 per cent in gas sales and 4 per cent in revenues is indicated by the comparative operating reports of manufactured and natural gas companies for the first eight months of 1931.

"In considering these comparative data it may be mentioned that during this same eight month period the production of bituminous coal declined more than 17 per cent from the corresponding interval of 1930, the output of crude petroleum dropped 8 per cent, pig iron production was down 41 per cent and steel ingot production 36 per cent. During this same period the number of freight cars loaded dropped 18 per cent while the production of automobiles declined by more than 26 per cent.

"Reports from a group of natural gas companies representing more than 85 per cent of the public utility distribution of natural gas indicate sales of nearly 465 billion cubic feet for the first eight months of 1931, a decline of only nine per cent from the corresponding period of 1930. The revenues of these companies for the same period aggregated about 193 million dollars, compared with 206 million a year ago.

"The consumption of natural gas for the generation of electric power during the first eight months of 1931, continued at a rate about 8 per cent above the preceding year, despite the fact that during the same period the production of electric power decreased by nearly five per cent.

"Reports from manufactured gas companies representing over 90 per cent of the manufactured gas industry indicate sales for the first eight months of 1931 of 23 billion cubic feet, a decrease of only two per cent under the corresponding period of 1930.

"The declining trend in water gas production continued during the current year, production for the eight month period averaging more than 3 per cent under the levels of the previous year. The quantity of coke oven gas produced however increased 8 per cent.

"At the close of 1930 the manufactured gas industry in Canada served 546,000 customers, an increase of 3 per cent, while the investment aggregated nearly $66,000,000. Nearly 19 billion cubic feet of gas were produced and sold during the year."

Left—Hideo Morioka, Chief Engineer, Nishi Works, Kobe (Japan) Gas Company, taking a stroll with Carl Schlegel

For Better Utilization

In his paper, "Serving the Public's Interests," Mr. George E. Whitwell outlined the work being done at the Testing Laboratory in Cleveland and attendant activities. He stated the reasons for establishing a branch of the Testing Laboratory in Los Angeles and its enthusiastic reception by gas companies and appliance manufacturers in the far west.

Mr. Whitwell emphasized the work being done at the Laboratory along the lines of cast iron pipe joints and the proper burning of mixed gases. This latter investigation includes a study of propane and butane.

Touching upon industrial gas research he said:

"It is very gratifying to report that the Industrial Gas Research Committee, headed by Mr. F. J. Rutledge of the United Gas Improvement Company, now has under way at the Cleveland Laboratory three basic research problems relating to the industrial use of gas. One of these investigations is a study of the application of recuperative principles; another the elimination of noises from industrial gas burners, and the third, a scientific development of the fundamental theories underlying the size, capacity and shape of various industrial gas furnaces.

"In the recuperation investigation it has been found, as originally anticipated, that during the burning of gas with preheated air it is possible in practical application to effect a saving in gas usage directly proportional to the increase in preheat temperatures, the limitations being only the ability of burner piping and manifolds to resist oxidation, and avoidance of pre-ignition of the air-gas mixtures at high temperatures. The solution of these practical difficulties are at present the Laboratory's principal objective.

"Burner noises have been quite definitely segregated into inspirational and combustion types and practical steps taken for their elimination.

"A silencer has been designed by the Laboratory to reduce inspirational noises and various types of porous burner plates experimented with to reduce, if not eliminate, combustion noises. The plan of isolating flames from the burner head is also being carefully studied as an effective means for reducing the difficulties encountered due to overheating of the burner.

"Although the investigation confined to the development of basic information on the capacities of various sizes and shapes of combustion spaces has only recently been undertaken, a great deal of useful information is expected from it. This problem will, in effect, cover practically all of the important principles relating to industrial gas furnace design and should assist materially in solving many of our present industrial gas problems."

Mr. Whitwell's paper revealed that 48.8 per cent more appliances were tested during 1930-31 than in the preceding year; also, that househeating appliances ranked first in increase, space heating equipment second and gas ranges third. Water heaters showed a decrease.

"This information," he said "should not be taken as an exact index of the amount of customer interest being shown in different types of domestic gas appliances but it does point out very definitely the fields in which the greatest amount of new development work is taking place."

Regarding the growing favor of approved appliances in the estimation of dealers and other he noted that, "during the past year considerable time and effort has been devoted to the collection of field information on the relative performance of different makes of approved and unapproved types of appliances. The recent remarks of a Texas gas appliance dealer seem to be quite typical of the general sentiment that now prevails: "Up until a year ago we handled a good many unapproved heaters but we had so much trouble with them that we have decided to handle nothing but approved lines from now on." Unquestionably, the Association's appliance testing program has already done a great deal to improve actual service conditions. It is particularly important during this period of rapidly changing gas supplies that flexible, easily adjustable, and safe appliances be utilized and promoted by our utilities."

Because he sacrificed his life in the rescue of a fellow-workman, the memory of Frank E. Steinhardt, a former foreman at the Hunts Point Plant of the Consolidated Gas Company of New York, was honored by the American Gas Association at its thirteenth annual convention. The posthumous award was made by Clifford E. Paige, president of the Association, and it was received by his widow.

Each year this award is made by the American Gas Association in recognition of the most meritorious deed in the saving of life in the gas industry.

When J. Newell was sent into a producer at Hunts Point by Foreman Steinhardt in July, 1930, the workman was overcome by gas. Steinhardt heard Newell's cries for help, entered the producer and assisted the latter to safety. Steinhardt, a man of large stature, also lost consciousness and efforts to lift him out failed. He was not released until after the producer had been cut apart, and later died at a hospital.

The Association's Program

Mr. D. D. Barnum, chairman of the committee for working out a program of Association activities to follow the Five-Year Program adopted in 1926, reported that the committee was profoundly impressed with the soundness and comprehensiveness of Mr. Cortelyou's report made in 1926 and decided that but few changes were to be made in this connection. Mr. Barnum also reported that "the Association is a necessary factor in the life of the industry."

As regards the expense to the Association relative to conventions, exhibitions and the like the report stated that "it was unanimously agreed that such activities should be curtailed. The expense incurred by the industry, outside of the regular budget of the Association, is not less than twice the budget itself, and while the Committee was unable to make definite progress as to conventions and exhibitions this year, in regard to having a convention or exhibit or both on alternate years this matter is before the Directors in an informal way and the matter will undoubtedly receive definite consideration in the near future. The suggestion that was considered was one of having the annual convention on alternate years, and sectional meetings in the off years. While the Committee made no definite recommendation in regard to this matter it is their hope that the subject will be thoroughly studied by the Executive Board."

Mr. Barnum brought out a very important recommendation which has already proven of great value in reducing unnecessary expenses. This had to do with the formation of a Control Committee whose function is as follows: "that a control committee be appointed by the President with approval of the directors, consisting of three members of the Board together with the President and Managing Director. That all activities whatsoever of each section be submitted by the Section Chairman with the approval of its managing committee to the Managing Director, who will submit the same to the Control Committee. That the Control Committee give prompt attention to such matters as come before it, and report to the Board with their recommendations. That the Chairmen of the respective sections be notified when his matters are to come before the Board, and that he be privileged to speak in regard to the same, before final decision is made by the directors."

Cooperation With Dealers

The address by Oscar H. Fogg, "Problems of Dealer Relationship," consisted essentially of a report of the Committee on Allied Trades, of which Mr. Fogg is Chairman. The following principles were formulated by this committee:

"It is recommended that gas companies take the initiative in bringing about conferences with dealers in their localities, to the end that the following or other mutually acceptable principles may be urged upon, adopted and put into use for the purpose of stimulating the sale of suitable gas appliances and promoting the use of gas service in a way that will be mutually advantageous to all participants.

1.—All gas appliances offered for sale by all cooperating agencies shall bear the seal of approval of the American Gas Association Test-Laboratory.
2.—No appliances or merchandise not directly related to the use of gas shall be sold by gas utilities.
3.—In all merchandising activities, the resale mark-up of all gas appliances that have received reasonable customer acceptance shall be consistent with present day merchandising practices. There shall be no premiums given with nor trade-in allowances made in connection with the sale of any such appliances unless all cooperating agencies are in a position to participate.
4.—The presenting to the public of those gas appliances not having received reasonable customer acceptance shall be considered as promotional activities and not as merchandising activities.
5.—Coordinated advertising of approved appliances should be developed by gas utility companies and local dealers, and the gas company should give all reasonable assistance possible to the dealer in advertising, displays and sales assistance.
6.—The deferred payment feature of our merchandising activities shall be on an economically sound basis."

Col. Fogg also brought out that since the adoption of these principles by the Executive Board on May 2, 1931 and their subsequent broadcast shortly after, more than 170 member companies, serving almost 5 million customers, are carrying out their merchandising procedure in accordance with the above recommended principles. He advised that the plan "is not prompted as a measure of defense against hostile legislation, or designed to offset the efforts of agitators and antagonists of the utility industry, as some of the critically-minded have implied, nor on the other hand, does any altruistic or philanthropic motive underlie its purpose.

"The new attitude toward dealer relationships is chiefly due to the broad belief of the gas industry that in this way; through these enlarged channels—many times multiplying existing sales and distribution outlets, the extension of gas service to an ever-growing public will be practically and rapidly advanced."

Directors and Officers Elected for the Association Year 1931-32

President—R. W. Gallagher, President, The East Ohio Gas Company, Cleveland, Ohio; Vice-President—Arthur Hewitt, Vice-President, Consumers Gas Company, Toronto, Ont., Canada; Vice-President—N. C. McGowen, Vice-President, United Gas Public Service Co., Houston, Texas; Vice-President—Howard Bruce, Chairman of Board, Bartlett-Hayward Co., Baltimore, Md.; Treasurer—W. J. Welsh, President, New York and Richmond Gas Company, Staten Island, N. Y.

Directors for 2-Year Term—F. S. Wade, President, Southern Counties Gas Company, Los Angeles, Cal.; B. J. Mullaney, Vice-President, The Peoples Gas & Light & Coke Company, Chicago, Ill.; H. C. Abell, Vice-President, Electric Bond & Share Co., New York, N. Y.; P. S. Young, Vice-President, Public Service Electric & Gas Co., Newark, N. J.; Herman Russell, President, Rochester Gas & Electric Corp., Rochester, N. Y.; C. N. Lauer, President, Philadelphia Gas Works Co., Philadelphia, Pa.; F. C. Freeman, President, Providence Gas Company, Providence, R. I.; F. A. Miller, Chairman of Board, S. R. Dresser Mfg. Co., Bradford, Pa.; J. S. DeHart, Jr., President, Isbell-Porter Co., Newark, N. J.

Exploiting Ideas

This address by Dr. Zay Jeffries, Consulting Metallurgist, Aluminum Company of America, while not treating directly with gas matters, was quite interesting and inspirational in its treatment of economic and attendant conditions.

He stated that many new things were in the offing which should materially help in the upward turn of business.

"To mention only a few items in passing," said Dr. Jeffries, "many of the machine tools in existence are now obsolete because of the development of the new cemented tungsten carbide cutting tools. Further obsolescence is certain as a result of additional developments in cutting tool materials. The machine tool industry can therefore look forward with confidence.

"The aircraft industry has been slowly but surely gathering momentum during the past ten years. Much fundamental work has been done not only with respect to aircraft engines and other parts but also in the field of aerial navigation. It is significant that July, 1931 was one of the

lowest months of the present depression but aircraft passenger travel registered an all time peak. Aerial contact with South America has been established. Also Europe is getting closer to us year by year. Whether this gap is first closed by heavier than air machines with several Armstrong seadromes strung across the Atlantic or by lighter than aircraft or in some other way, there can be no question about its ultimate accomplishment. It may come sooner than many of us anticipate and with it will come increased industrial activity.

"Another development which has been gaining headway during recent years is the production and utilization of ultra-violet radiation. The industrial activity resulting from a several fold increase in volume during the next few years will be helpful and welcome. The more normal growth of children and generally increased human happiness resulting from the judicious use of ultra-violet radiation will be the main advantages. Healthy people are large consumers and they are relatively immune to one of our present ailments, fear.

"I might mention briefly another industry which has great potentiality for increasing industrial health as well as the health of individuals, namely, air conditioning. This industry is old enough to have been well tested and yet new enough to have practically a clear field ahead for its exploitation. Your Committee on Industrial Gas Research has considered the potential use of gas in the air conditioning industry in its 1931 report. The members have put particular emphasis on the use of gas in summer cooling. In addition to several types of equipment for industrial air conditioning, there are now available a number of devices for office and home service. Taking one of these merely as an example, the air is washed, humidified and circulated. It is needed more in winter than in summer. It should be supplied, for best winter operation, with about 225 gallons of water per 24 hours at a temperature of 120°F. Assuming operation seven months per year, each of these devices would require, according to Mr. E. D. Milener, about one hundred thousand cubic feet of average gas for the seven months. The people of the United States could to advantage use ten million of such devices. But if one million are put into service during the next few years, it means two to three hundred million dollars of new business, an increase in water consumption, an increase in the consumption of electrical energy and an annual increase in gas consumption for heating water alone, of about one hundred billion cubic feet."

Section Chairmen Elected for the Association Year 1931-32

Accounting Section—Chairman—Wm. A. Doering, Boston Consolidated Gas Co., Boston, Mass.; Vice-Chairman, J. M. Roberts, The Peoples Gas Light & Coke Company, Chicago, Ill.

Commercial Section—Chairman—Samuel Insull, Jr., Midland United Co., Chicago, Ill.; Vice Chairman, Walter C. Beckjord, Boston Consolidated Gas Co., Boston, Mass.

Industrial Gas Section—Chairman—A. J. Peters, Consolidated Gas Company of New York, New York, N. Y.; Vice Chairman W. F. Miller, Public Service Co. of Northern Illinois, Chicago, Ill.

Manufacturers Section—Chairman—D. F. Kahn, Estate Stove Company, Hamilton, Ohio; Vice-Chairman, D. B. Stokes, United States Pipe & Foundry Co., Burlington, N. J.; and Robert M. Leach, Glenwood Range Company, Taunton, Mass.

Publicity & Advertising Section—Chairman—W. H. Hodge, Byllesby Engineering & Management Corp., Chicago, Ill.; Vice-Chairman, Henry Obermeyer, Consolidated Gas Company of New York, New York, N. Y.

Technical Section—Chairman—I. K. Peck, Midland United Company, Chicago, Ill.; Vice-Chairman, J. A. Perry, United Gas Improvement Co., Philadelphia, Pa.

Natural Gas Department—Chairman—T. J. Strickler, Kansas City Gas Co., Kansas City, Mo.; Vice-Chairman, L. K. Langdon, Union Gas & Electric Company, Cincinnati, Ohio.

Hearty Greetings from Sir Francis Goodenough

The address by Sir Francis Goodenough was replete with expressions of good-will from the gas industry of Great Britain. He congratulated American Gas Association on being able to hold such a fine convention under the prevailing general conditions.

He went on to narrate of the fine impression President Paige made on the occasion of his visit to the First International Gas Conference in London last June. He especially emphasized the cordial meeting of the Prince of Wales and Mr. Paige on more than one occasion.

Sir Francis spoke of his high regard for this country and its institutions and mentioned the various ways in American gas men. "There is great need," he said, "for good-will and cooperation between all of us in both nations in order to overcome the difficulties of the present situation. Those difficulties are nothing but temporary on either side of the Atlantic. Both countries are sound in wind and limb. There is no occasion for any of us to be disheartened. I think that what is wanted is the recovery of a spiritual outlook on life, the practical application of the Golden Rule in all our affairs. There is too much narrow nationalism today and not enough inter-nationalism. We shall never find salvation through selfishness. We never shall find salvation through conquest, only through contact and mutual service."

Next Year's Convention

October

Atlantic City, N. J.

Natural Gas Department

THE meetings of the Natural Gas Department although somewhat limited in the number of papers presented were well attended and productive of valuable ideas. It must be borne in mind that natural gas received considerable attention in the various other section meetings. This was particularly true of the very fine address given before one of the General Meetings by Judge Caster and, in this connection, it has been deemed advisable to include the abstract of this address in the present section

T. J. Strickler, Chairman-elect, Natural Gas Dept.

Applied Geophysics

Much interest attended the reading of the paper, "A Comment upon Present-Day Applied Geophysics," by F. W. Lee. Incidentally this paper appears as the U. S. Bureau of Mines Information Circular 6496 and the quotations used are taken therefrom.

"Operating engineers and mining executives," said Mr. Lee "are interested in the science of applied geophysics, but are looking for a simple and understandable exposition of its problems, instead of dissertations which are becoming more and more involved and increasingly difficult to comprehend."

"Fundamentally, the science aims at a differentiation of subterranean geology with the object of finding useful mineral products by the study of gravitational, magnetic, seismic, electric, and other fields which may be associated with the materials naturally or which may be applied to them. The more skillfully these fields are recognized, applied, and analyzed the greater will be the possibility of interpreting results in a way that will be remunerative both economically and scientifically."

Regarding gravitational methods he said: "The physical and mathematical possibilities of gravitational methods have seemingly been reached and have become standardized so that their application is now limited only by the resourcefulness of the geologist and the complexity of the subterranean structure."

From the standpoint of magnetic methods he noted that "singularities existing in the ground have heretofore been used as a lead in this method but are now being gradually replaced by more comprehensive methods similar to those used with the torsion balance. From the geological viewpoint magnetic susceptibilities afford means of further differentiating geological structure in a way quite similar to that used in gravity methods."

As to electrical methods he stated that progress had been slower. "However, because of the great possibilities inherent in electrical methods, even though very complicated, they are of great importance to the progress of the art. Undoubtedly the mathematics and technique of the methods will be more highly developed when they are as thoroughly understood and correlated as are the gravity methods."

Discussing geothermal methods he said: "Much work has been done on the determination of temperature horizons and gradients but little on the quantity of heat transmitted. The technique of measurement of temperature is well established, but the technique of measuring heat flow is much more difficult. To draw a comparison, voltages can be measured easily but not current. In other words, half of the story is lacking. The measurement of the number of calories emitted per square meter over various areas and its correlation to geology would prove most interesting."

The following remarks are also taken from Mr. Lee's paper.

"From the nature of the phenomena, radioactivity methods do not admit of great mathematical development, but lead directly to geological application. Nevertheless, there are some interesting scientific questions which should be settled. For example, will emanation and gamma-ray surveys lead to the same geological interpretations?"

"In regard to the instruments used in the seismic method there is still much discussion as to whether it is more desirable to measure acceleration, velocity, or simply displacement. An accurate determination of displacement would probably be most desirable, since from it the others may be singularly determined; that is, without integration factors. Most of the recording instruments have their inertial system reacting with that of the incoming impulses and since the moving impulse is the important factor, especially in character study, the matter of instrument construction is in no way settled."

"Since the factors which control self-potential methods are of such variable nature these methods do not lend themselves to such careful work as the more standard methods do. From the mathematician's point of view they would be hopelessly complicated for fu evaluation."

Transporting Natural Gas

Outstanding developments in the transportation of natural gas from the field to the market, with a history extending back into ancient times of long-distance pipe problems was presented to the convention by R. W. Hendee, of Oklahoma Natural Gas Corporation.

"This new era in long distance pipe line construction

from new fields to new markets was really started in 1926 with the construction of 170 miles of 22-in. line from the Monroe Gas field to Baton Rouge, to be followed by a 90 miles 18-in. extension to New Orleans. From that day to this there has been a continual construction period in which announcements of lines 20, 22 and 24 in. in diameter reaching out as far as 1,000 miles from the field to the market become every day reading.

"These recently designed and constructed pipe lines bring out several trends both in construction and operation:

"1. Higher operating pressures are being used, with one line designed for 900 lbs.

"2. In order to increase the capacity of the lines to the maximum, which is necessary when gas is carried long distances, by these increased pressures, pipe is being made with maximum tensile strengths of from 70,000 to 80,000 lbs.

"3. Manufacturers of electric and gas welding rods have met this increase in the strength of the pipe by a like increase in the strength of the welds produced.

"4. Although most of the new lines are operating at high pressures, there seems to be a tendency towards standardizations of compression ratios of between 1.5 and 2.0.

"5. So far there has not been any standardization in the type of joint, some engineers using the solid coupled, others the combination of coupled and welded and still others using nothing but solid welded lines.

"6. Main line, or block, gates are set anywhere from five to 10 miles apart. Both plug and gate valves are used.

"7. A careful scrutiny of the map of the United States will show clearly that practically all of the recent pipe lines pass directly through or adjacent to the largest coal areas in the country. How simple it would be, when natural gas is gone, if it ever does go, to make coal gas right at the mouth of the mines and transport it to the markets in these existing pipe lines."

Information on Natural Gas

Judge H. O. Caster gave some interesting and valuable information on the subject of natural gas in his paper, "Developments in the Natural Gas Field." He brought out that there are two billions of dollars invested in the natural gas industry in this country; also 55,000 gas wells, 72,000 miles of mains and gathering lines, and 50,000 miles of distributing mains serving 22,000,000 people.

He went on to state that natural gas is generally discovered as a by-product in the quest for oil and is frequently allowed to waste if not used soon after its discovery. The increased knowledge in geology and geophysical methods of ascertaining what is below the surface, indicated Judge Caster, has resulted in a great overproduction of oil and gas. "This increase of knowledge," he said, "may lead to the early discovery of all the principal oil and gas pools or fields in our country and, consequently, lead to a much earlier exhaustion of our gas and petroleum resources."

Enumerating the reserves of some of the principal fields he said these totalled to the huge figure of thirty trillion cubic feet.

He next sketched the type of ground formation where gas is found and discussed the variation in pressure in several fields. These range from about 450 pounds in the Texas Panhandle to nearly 2000 pounds in the field near Oklahoma City.

"The life of these pools," said Judge Caster, "and the amount of gas that can be recovered and marketed depends, of course, upon the amount of gas in the sands, but it depends to a large degree upon how much of this gas can be conserved for the markets and how much of it is allowed to be wasted. At the present time in many of the principal fields, such as the Panhandle, more gas is blowing in the air than is being taken out and used."

The paper traced the development of the long pipe lines and the growth in transmission pressures which

now run upwards of 700 pounds. Relative to the financial aspect involved in running these lines he said:

"The investment in these super-lines is enormous, and it behooves those who are contemplating the undertaking of their construction to make the most careful study, both of the field to determine the adequacy of the supply, and to the market, to be assured that reasonable rates can be secured over a sufficient length of time to amortize the investment.

"These huge investments in the pipe lines must be amortized and the money returned with reasonable profits on the investments during the life of the fields reached; or, the lines must be extended by added investments to other fields and the gas transported over longer distances to reach the same market. In this sort of an investment there is added what gas men, for want of a better term, call 'mining hazard.' This mining hazard consists of several different factors; that the pool or fields may not produce the gas estimated; that more gas will be wasted than was anticipated; that proper conservation laws will not be enacted or enforced; and, last but not least, that other large pool or pools may be opened sufficiently close to the markets served to render the investment in long lines valueless. All of these factors should be taken into consideration before investments in pipe lines are made."

The necessity for maintaining an adequate supply of gas was stressed and the relation of a good industrial gas load to good domestic service.

Relative to knowing a field before tapping it with important pipe lines he noted that "it is not safe to build a major pipe line project from a new and untried gas field. When the gas fields of Kansas and Oklahoma were opened in the early part of the century, it was thought that they would supply the markets for from fifteen to thirty years. This judgment was largely based on information secured from experiences in the West Virginia and Pennsylvania fields. However, the gas supply in practically all of these Kansas and Oklahoma fields was exhausted in from two and one-half to three and one-half years. The pipe lines were constantly searching for new fields and new pools; rates were based on such a low level that most of the large pipe line companies were eventually forced into bankruptcy and receivership, and the public suffered from the lack of gas.

"The Hugoton field in southwestern Kansas is very large in extent and is estimated at around one million acres, but no one can tell how much gas it will produce, nor how long it will last. It is an untried field; it has had no pull to date and, while it is generally believed that there is an enormous supply of gas there, it would be hazardous to build a major line depending upon it for its source of supply."

As regards the very important matter of load factor he brought out that "one of the great problems of the natural gas company today is to sell its product in such a way as to give the pipe line the necessary load factor. A domestic house-heating load is carried at a very poor load factor, as there is no demand for it during a great many months in the year. Nevertheless, the pipe line company must enter into purchase contracts with the producer and give him sufficient takes, and on a sufficiently good load factor, to induce the producer to continue drilling and supplying the pipe line with gas.

"We are already at the dawning of the day when gas will be used by the domestic consumer in the summer time for house cooling, and when it will be used for building cooling in the larger cities. We may confidently expect to see the store, the bank, the office building, and even the manufacturing plants cooled by gas in the summer, as well as heated by it in the winter. When that times comes, the domestic gas load factor will be greatly improved, and it might be possible for the gas companies to reduce their rates and thereby increase their markets."

In conclusion Judge Caster stated that the American public is quite agreeable to the gas company earning a fair return upon its investment and that "it does not want something for nothing."

Technical Section

UNDER the chairmanship of R. G. Griswold the Technical Section held two well attended meetings at which only resume reports were given by the main committees and the bulk of the time devoted to the discussion of some of the major technical problems which confront the industry. In some contrast with the conventions of previous years it was evident that these problems in most cases centered around the economic and engineering aspects of handling large quantities of gas, in a considerable measure problems either created or greatly increased in importance by the advent of natural gas.

Acting favorably on the report of its nominating committee the Technical Section selected I. K. Peck as chairman and J. A. Perry as vice chairman to supervise the activities of the section during the coming year. Mr. J. Herbert Canning, president of the Institution of Gas Engineers of Great Britain, presented at the first session of the Section a paper pointing out the contrasts between the gas industry of his country and that of the United States. He emphasized particularly the difference in the relationship between the publicly owned works so common in Great Britain and the widely coordinated activities under private ownership with holding-company management in the United States.

I. K. Peck, Chairman-elect, Technical Section

Economics of Gas Distribution

W. C. Beckjord brought out the following:

There are four factors to be considered in distribution investment: (a) Material, (b) labor, (c) supervision, and (d) cost of money, including taxes, depreciation, and interest.

"All these factors are important and interdependent, but perhaps the principal one to be considered is the cost of money, because it is practically a constantly continuing cost so long as the main is in use, once it is laid. It is a factor often overlooked in the cost of making and maintaining extensions into new territory, and many companies have found to their sorrow that after a large extension has been made the major part of the operating profit is entirely absorbed by the fixed charges.

"In order to better control capital investment it is necessary to know precisely why expenditures are made and for what purpose. Broadly speaking, distribution expenditures can be divided into three main classes:

a. Expenditures to serve new consumers.

b. Expenditures made to meet city requirements.

c. Expenditures made on the judgment of the company's management, in order to give better service and to take care of future growth as required.

"The first two classes cover those expenditures over which the company, to a large extent, has limited control, because naturally, if the business to be gained warrants it, the expenditures will be made, for customer demands for service must be met. However, even though the company has little choice in whether or not an extension shall be made to connect petitioning consumers, the company is always faced with the problem of building for future growth in the new area about to be entered. In days gone by, generous provision was made for the future development of a certain area and much larger mains were laid than required to begin with, in order to provide for future growth. This policy can no longer be followed if the industry is to keep on a proper earning basis.

"If the industry is to be kept on a proper earning basis, the old policy of increasing volume of mains to take on new business from old and new areas served will have to give way to new methods more flexible and involving less fixed investment.

"The changed conditions of living engendered by the use of the automobile have caused people to move from the centers of population to the suburbs, which have evolved two things:

a. The great rate of increase of idle investment in distribution equipment in the downtown area, due to lack of sales and loss of customers.

b. The increase in distribution investment to take care of suburban areas, which practically amounts to a duplication of investment with very little increase in total business.

"The development of the high pressure distribution system has naturally followed because it would be economically unsound to attempt to take care of suburban areas with the old methods of intermediate pressure distribution. This has meant a constant increase in pressures until now many areas are supplied with pressures approximating 100 lbs., with service governors at the individual customer's premises.

"Necessarily as time goes on the pressure will have to be increased up to a maximum of perhaps 100 lbs. or even higher to take care of requirements, but this can be done by adding additional compressor capacity or additional pressure tank capacity at strategic points along the line to take care of the peak loads. In this way the network grows in accordance with the load and later on, after a period of years, if necessary to get increased transmission capacity the line can be "looped" as it is expressed in natural gas technique. The fixed charges, which have been saved in the meantime, will more than make up the difference in additional investment cost. The areas involved are so great it would be impossible to attempt to take care of the growth of a given territory over a period of years by anticipating distribution requirements and the fixed charges would be so great as to make the project entirely unsound.

Modern gas distribution practice is rapidly getting away from the use of distribution holders and they are used more as an efficient adjunct to plant operation. In other words, it is similar to the electric method of distribution where the turbines pump electricity out from the stations constantly, the voltage varying to meet the demands. Gas boosters and compressors are performing the same function and usually these stations are concentrated into relatively few locations and in some instances all the pumping is done from one source. This means that the transmission network becomes underground storage capacity, particularly where the pressures are high enough to permit this.

"In natural gas practice the storage capacity in transmission lines under high pressure is enormous, and in many cases, this storage capacity is utilized not only to take care of peak loads due to sudden changes of temperature, but also, in cases of breakdown in the line by closing off the valves across the area in trouble, sufficient pressure can be maintained to permit the repair of the line, and still continue to give service.

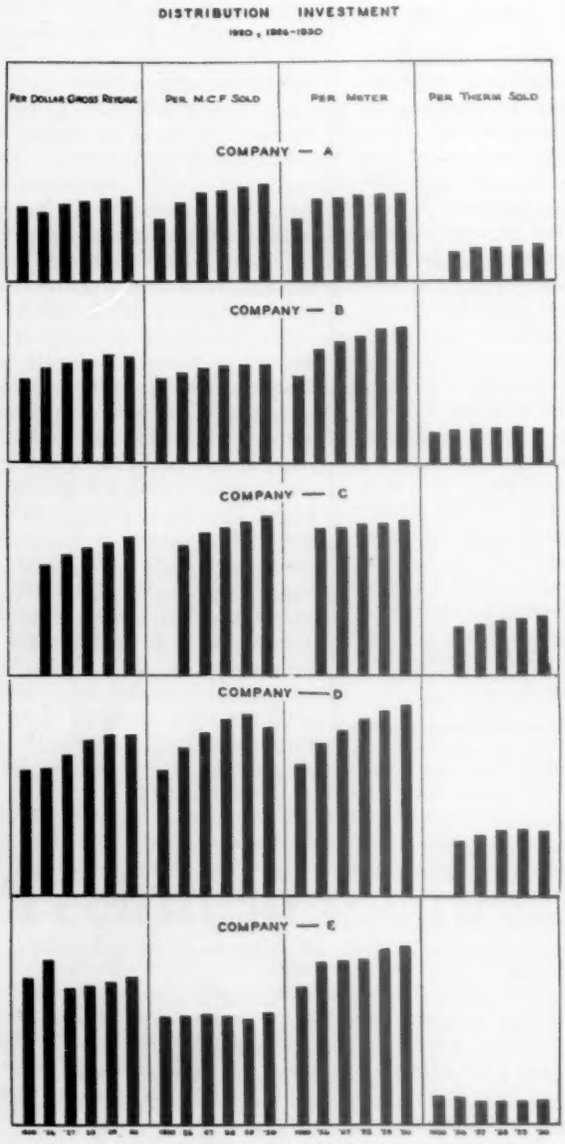
"Natural gas transmission over thousands of miles of territory has paved the way to solve the transmission and distribution problems of the industry. Natural gas industry has been compelled to face the problem of investment costs because most of its propositions were competitive and existing conditions had to be met. The transmission investment cost has been kept down by maintaining a high range of pressure throughout in

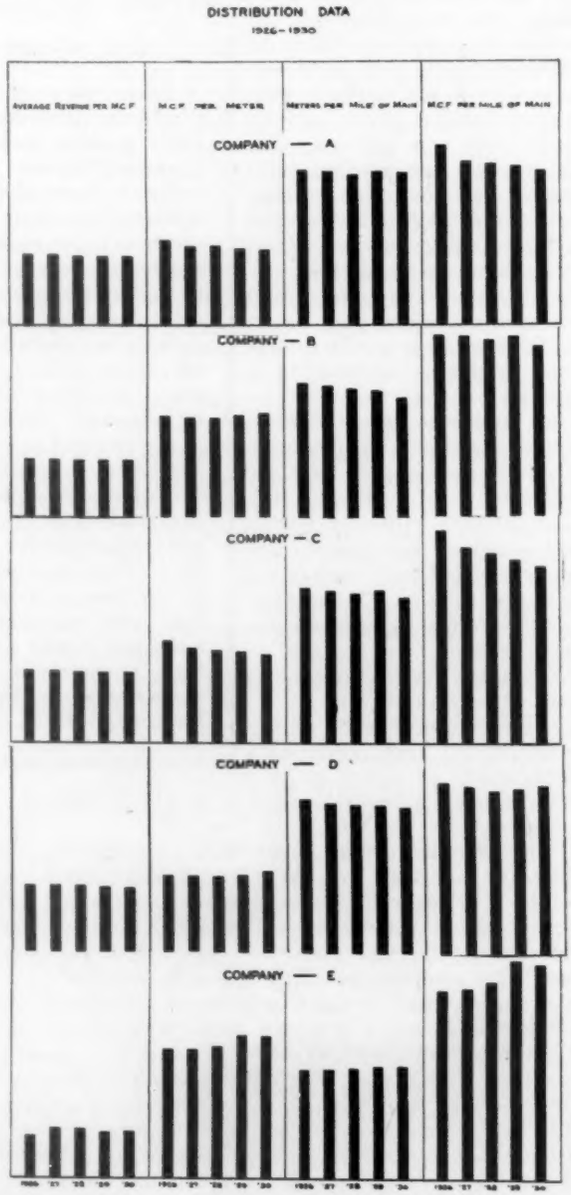
A FUNDAMENTAL PROBLEM

Economics of gas distribution have gradually achieved a position of increasingly greater importance in the gas industry. Higher development of competitive fuels and greatly increased gas distribution facilities necessary for adequate service make it imperative that investment costs be reduced to a minimum in order to meet competition. Increased sales are absolutely essential for the welfare of the industry, and in order to obtain them with a reasonable, or any margin of profit at all, investment cost must be reduced. Economic gas distribution is the skillful application of distribution methods involving the most efficient utilization of mains and equipment now installed, and the installation of new equipment better suited to fit the needs of current and future demands, so that in the last analysis a fair return, consistent with adequate service, will be realized per dollar of investment. Distribution investment includes cost of all mains services, meters, and distribution holders.—W. C. Beckjord.

order to reduce the friction losses in forcing the gas through the lines, and while the necessity for this has not become paramount in local distribution systems, there is no question but that the time is rapidly approaching. This problem can be met by additional compressor stations and storage tanks, and higher distribution pressure at the consumers' premises, using service governors, at a low initial cost and low maintenance cost as well.

"There has been a great deal of discussion in years gone by on the question of peak loads on the distribution system. One of the factors, which has mitigated against additional house heating load, is the tremendous peak load demand on the distribution system. With the increased pressures in the transmission belt line sys-





CHARTS

1. In the presentation of the Economics of Gas Distribution, it is desired to set forth a clear picture of prevailing conditions in several major gas companies, as follows:

a. The definite increase in capital distribution investment relative to gas sales volume and revenue.

b. The effect of the general movement of population to the suburbs upon gas sales volume relative to capital distribution investment.

c. The burden of fixed investment caused by City and State requirements, and by building to meet several years of anticipated increase in demand.

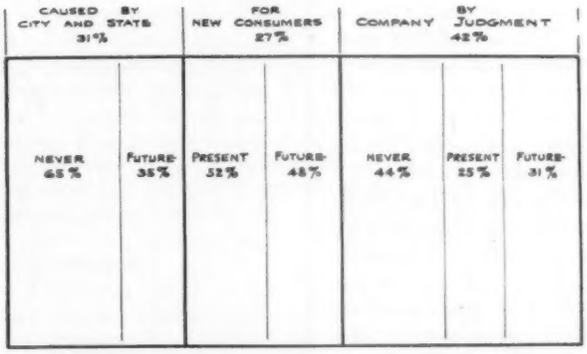
2. The data presented is actual individual company data, contributed by several companies located on the western coast and in the northeastern states.

3. Each company is set up separately, so that various factors of distribution will stand out clearly for comparative study.

4. With little imagination one can visualize what will happen to net earnings if such conditions are allowed to continue indefinitely along with a downward trend of gas sales and revenue per unit of gas distribution equipment as illustrated in the following set of distribution data charts for the same five companies. The increased investment cannot be attributed to a lower purchasing power of the dollar—in fact, the purchasing power of the dollar has definitely increased in the last five years.

tems, this is not so serious a factor as it was. Likewise, the higher secondary pressures permit greater leeway in the low pressure system. It is still a fact that the peak hour in the transmission systems in the northern parts of the country comes on Thanksgiving Day between the hours of eleven and one, so that until this particular peak hour is passed it cannot be said that the house heating load is absorbing more than its share of pressure requirements.

PROBABLE TIME OF REALIZATION FROM CAPITAL EXPENDITURES IN 1930 FOR MAINS



"There is another factor to be considered in the question of analyzing the value of the various classes of business. It would seem that the period load factor should be considered as well as the yearly load factor. In other words, over a period of from five to ten years, there will be a great difference in industrial load due to cycles of business. A large investment may have been made from time to time to take care of additional industrial load with a high demand, and a year or two later the load may fall off entirely because there is no business. In periods of industrial depression, the house heating load is a very desirable one to have because while some of it may be lost due to the varying prosperity of the customer, in general, a greater portion of it is retained, and over a period of from five to ten years, the load factor with the house heating business included will prove to be very desirable. In other words, it may be stated that in selling the load, which has a relatively high peak demand and a small number of days' use throughout the year, the reserve plant capacity is being absorbed, because usually these factors are more important to the plant than they are to the distribution system on account of the possibility of raising transmission and distribution pressures. But, if in the meantime, other industrial load is lost that portion of plant capacity allotted to this business would be idle, so it would seem the part of good business to have loads of varying characteristics, which give a better composite load factor over a period of years. The yearly load factor cannot always be taken as a criterion."

Economic and Engineering Survey of the Gas Industry

"With conditions within the gas industry more or less in a state of flux," said Mr. I. K. Peck, "as a result of the widely different characteristics of the gases now available, and their distribution, sale and utilization, it has been necessary for our Committee to keep in close touch with the rapid developments in the production and utilization of natural gas, oil refinery gas, and their mixtures with manufactured gas, etc., and to concentrate on obtaining the greatest possible information concerning the potentialities of these mixed gases.

"Probably the most extensive research investigation that the Association has undertaken to date has been that connected with the mixing of gases under the direction of the Mixed Gas Research Committee. This work, extended from time to time, has been carried on over a period of the last four years and more than 300,000 separate tests have been made. The first part of the investigation, which included the mixing of various kinds of city gases, resulted in securing basic information on the effect of variations in specific gravity, heating value, chemical composition, and gas pressure. Upon its completion early last year, a brief summary of the results was published, but this treatise was necessarily of a general nature since it was not felt practical to publish the complete results as each company has its own specific problems and the majority of the data would not be applicable to any one particular situation.

"Rapid developments in the use of the liquefied petroleum gases have taken place throughout the country during the past three years. The number of butane-air gas plants established has increased rapidly and mixtures of butane and propane are being distributed from central plants in several localities. The active interest created in this subject soon indicated the need for accurate and complete data on the possibilities of the use of such products."

"In this study, the Committee endeavored to follow what was believed would be the normal developments in the use of such products. Consequently, research thus far has been confined largely to, first, a thorough investigation of the possibilities of augmenting a base supply of natural gas with mixtures of a low heating value manufactured gas and butane, to meet peak load demands. This study was taken up in four steps, using four base gas supplies ranging in heating value from ordinary manufactured gas through to natural gas. With the heating value of the base gas constant in each case, the amount it could be augmented through the use of butane enriched producer, blue and coke oven gases was determined. It was disclosed that the limits fixed by these investigations could be increased somewhat through increasing the heating value by the addition of more butane to compensate for decreases in specific gravity. A study was also made in this series of investigations of the possibilities of using reformed natural gas enriched with butane for augmenting the supply of various manufactured gases.

"A second investigation has been confined largely to the determination of the most flexible heating value standards for butane-air gas plants. This has included a study of butane-air mixtures ranging in heating values from 500 to 1150 B.t.u. per cubic foot. A study was also made of the dew points of various butane-air mixtures under various conditions of temperature and pressure.

"Early last year an extensive study was made of the chemical composition of propane type bottled gases, and of the performance of various bottled gas units used in conjunction with domestic gas appliances. This investigation served as a basis for A.G.A. Approval Requirements for ranges designed to utilize such fuel. Coincident with this, a thorough study was also made of gas range performance, utilizing butane-air. It is expected

that this work will later be extended for the purpose of developing approval requirements for other types of appliances for use with these gases.

"Additional research work has only very recently been completed in the utilization of varying B.t.u. blue-producer gases enriched with natural gas; on straight blue gas enriched with natural; on natural mixed with reformed natural; on reformed natural with natural-producer gas mixtures; their interchange and when interchanged with carburetted water gas. This sums up the important work of the Mixed Gas Research Committee to date."

Gas Mixtures

Mr. J. A. Perry stated that blending gases to meet our requirements is today an important problem. A correct solution for each particular situation is a measure of our abilities to accept and to use those materials which will give the most economical as well as the most satisfactory service to our customers.

"Certain gases are inherently more suitable for base gas than for peak gas, notably coal gas, by virtue of the character of the production equipment, and the limit in transportation facilities. Other gases are comparatively more suitable for peak production, notably blue gas, carburetted water gas, oil gas, reformed gas, natural gas, or mixtures of natural gas with either blue glas, carburetted water gas or coal gas. The peak gases are normally blue gas, carburetted water gas, butane or butane enriched gas."

"Generally speaking, base gases may require high investment costs but should remand low material and conversion costs per M. cu.ft. The ratio of these costs varies with almost every situation, deepnding not only upon the investment cost, the materials and conversion costs, but also upon the character of the load and its effect on the amount of peak gas produced.

"The problem of actually mixing gases after they are produced has been satisfactorily solved by several equipment manufacturers.

"The problem of selecting and proportioning the use of various kinds of gases is a separate problem to be solved for almost every particular situation. Once certain tentative conclusions have been reached, actual tests of the various base, peak and other mixtures should be tried out on the various appliances in general use for that particular situation and then the proposed mixtures should be further modified to secure the best all around operating and utilization results."

"During recent years the development of the various heating loads, house heating, water heating, industrial, etc., has resulted in increasing maximum day sendouts. In some instances the maximum day may be in excess of three times the average summer day sendout. With coal gas for the base load equal to the average summer day sendout, it is now necessary not only to thoroughly mix the coal and carburetted water gas but to find out what, if anything can be done to modify these mixtures to better suit our requirements. With our 530 B.t.u. and lower heating quality standards, we can greatly improve conditions by using as much producer gas as possible with the coal gas for increasing its gravity during the summer season.

"Other modifications have been developed as shown in the problems presented in the complete article.

In recognition of the best paper on a technical subject presented at last year's convention of the American Gas Association, Philip Thornton Dashiell, engineer of works of The Philadelphia Gas Works Company, Philadelphia, Pa., was awarded the Beal Medal. The presentation was made by T. R. Beal, president of the Central Hudson Gas and Electric Corporation, Poughkeepsie, whose family has donated this coveted award for years.

Mr. Dashiell won this distinction through his paper on "The Use of Heavy Fuel Oil in the Manufacture of Carburetted Water Gas," which was submitted last year before the Technical Section of the Association.

Mr. Dashiell, a native of Annapolis, Md., is a graduate mechanical engineer of the Sheffield School, Yale University, has been identified with properties of The United Gas Improvement Company since 1899, when he joined the United Gas Improvement Company as a cadet engineer.

From that position he advanced steadily until 1928, when The Philadelphia Gas Works, which had been operating as a department of The United Gas Improvement Company became The Philadelphia Gas Works Company, and Mr. Dashiell was given the post of engineer of works.

Providing for Peak Loads

"The purpose of this paper," said Mr. C. S. Goldsmith, "is to outline some of the things that may be done to facilitate the handling of peak loads with a minimum investment of capital, or with the investment made in such a way that it will be partially productive at other times as well.

"It is assumed that all companies have a distribution plan in accordance with which they expand their systems economically to provide for normal consumer growth as well as for continued increased loads on existing meter installations. Capital invested for such purposes returns earnings commensurate with the increased business.

As regards the choice of new capital investment as against the trying out of other expedients Mr. Goldsmith made the following timely remarks:

"If a new transmission main has to be laid to handle peak hours, the lower pressures that will be carried on off-peak hours may effect sufficient economies in pumping costs and decreased unaccounted-for to pay a large part of the yearly carrying charges, while additional pumping units to accomplish the same purpose will not make returns the remainder of the year. Some of the things we should investigate, however, before resorting to costly and irrevocable capital expenditures for new mains are the following:

"1. Increasing Initial Pressures:
   a. Use of spare compressor units.
   b. Valving off certain sections.
   c. Operating compressor units in tandem.
"2. Increasing Terminal Pressures:
   a. Use of high-pressure holders.
   b. Use of sub-surface high-pressure main.
   c. Use of propane or butane.
"3. Conversion of low-pressure mains to transmission mains to supply district regulators.
"4. Connecting dead-end mains.
"5. Peaking up district regulators.
"6. Conversion of low-pressure mains to medium-pressure mains to conduct gas away from district regulators.
"7. Conversion of certain low-pressure sections to medium pressure with house governors.
"8. Establishment of demand rates to reduce peak consumption."

"In conclusion, it is the distribution engineer's job to handle any load that may develop in the most efficient and economical manner. It is the rate maker's and sales engineer's jobs to provide a load that can be handled economically."

Pipe Joint Research

"It is now felt," said Mr. K. R. Knapp, "that enough information has been secured and sufficient check tests run, to permit making a number of definite statements as to the type and character of joints which may be recommended for both repair work and new construction. The field of bell and spigot joints has been thoroughly covered in the smaller sizes, and while some work still remains to be done on large pipe, it is not believed that the presentation of the conclusions should be delayed until this is completed."

"Repair of Old Joints. It is felt that leak clamps offer the most practical and advisable means for the permanent repair of leaking castiron bell and spigot joints up to and including 16" in size. For the most successful performance their design should provide for the following:

(1) Ample cross-sectional area of the gasket. The width should be substantially greater than the width of the joint space.

(2) The segments of either of the clamp rings should be of such design as to afford ample rigidity and also be as few in number as possible. Means should be furnished to provide a secure and substantial method of locking the individual segments to form substantially a solid ring when finally assembled. Such construction is essential to prevent excessive distortion of the clamp ring which would result in a release of compression on the gasket. This is of particular importance in larger size clamps.

(3) It is important that careful consideration be given to the dimensions of the bell to which a clamp is to be applied. Clamps are available to fit the majority of bells usually encountered in service. Care should be taken that a clamp of the proper dimensions is selected.

"The following leak clamps are considered as meeting these requirements, and are recommended for use as shown:

6"—Dayton—New Style—No. 4003—No. 4004
Dresser—New Style—No. 4½ H.P.
Skinner—New Style—No. 1 H.P.
16"—Dresser—New Style—No. 4½ H.P.
National

"In preparing a joint to receive a clamp, care should be taken that the following conditions are observed:

(1) The surfaces of the joint and the adjacent metal should be thoroughly cleaned.

(2) When lead joints are used recaulking may be resorted to in order to face up the joint surface as nearly as possible flush with the bell. If the lead is recessed more than ⅛" after recaulking, it is advisable to cut out the lead to a depth of at least ½". Either cast lead or lead wool, properly caulked, may then be used to reface the joint flush with the bell face. If so desired, the joint may be refaced with cement after cutting out not more than ½" of the top lead, using the method given below for cement joints.

(3) For cement joints the top cement may be cut to a depth of not more than ½" and the joint refaced with neat cement. Care must be taken to finish off the cement smoothly. The clamp may be applied immediately to the green cement.

(4) A thin coat of gasket compound or similar lubricant should be applied to the area to be covered by the gasket and also to the joint of the gasket. Where a joint has been refaced with cement the use of the compound is unnecessary except on the joint of the gasket.

"Generally speaking it is considered that rubber gaskets are to be preferred to those of the duck tipped type.

"New Joints. The following recommendations for new construction are made, based on the results of tests on 4" and 16" joints.

"In considering these recommendations on new joints it must be remembered that the test conditions were probably more severe than normally occur in actual practice, distortion being greater and more violent, and that the test gas was a clean dry gas, namely, air. The record of leakage on thousands of miles of bell and spigot pipe made up with cast lead or cement or lead wool or a combination of these materials with yarn cannot be refuted. This record, however, was established under conditions of manufactured gas, saturated and supersaturated with water, oil, naphthalene, etc., the deposition of which in the mains aided materially in the closing up of joint leaks if and when they occurred. Also, pressures in the past have been lower than they now are. As B.t.u. standards were lowered for greater economy, less oil was deposited in the mains; then came change overs from manufactured gas to bone dry, moisture hungry, natural gas. This gas produced the reverse effect of manufactured gas drying out the joints, with ensuing increase in leakage. It is for this worst condition of bone dry, moisture hungry gas that the following recommendations are made.

(1) Cement joints are not recommended for pressures much in excess of 10" of water and should be restricted as far as possible to the smaller sizes. No. 1 A.G.A. standard bells should be used. No. 2 or "B" bells are not recommended.

Cement is not suitable for joints as large as 16". The joint material in this size is relatively so weak in respect to the pipe as to be unable to withstand the action of external forces tending to deform it.

(2) Cast lead joints are not considered satisfactory for new construction even for low pressures. Lead offers little resistance to deformation and is unable to return to its original position when once deformed. Lead joints are thus likely to leak readily.

(3) Lead wool joints, while superior to cast lead are quite expensive to prepare and it is doubtful whether they can be depended upon to stand up in service. The inherent objection to the use of cast lead applies also to a certain extent to lead wool but may be overcome

partly by more effective caulking such as obtained when air tools are used. The workmanship is of great importance in preparing such joints.

(4) The use of two concentric rubber rings with inclined faces in contact and held in place by cement is recommended for joints up to and including 16" in size, for pressures above ½ lb. Such joints have been found tight under severe test conditions at 50 lbs. pressure. Their use is recommended for working pressures up to 25 lbs.

(5) Mechanical joints such as the Anthony, Dresser and Doublex Simplex all of which make use of rubber rings as gaskets, are recommended for use with cast-iron mains for pressures above 25 lbs. These have been tested out and found tight at pressures up to 150 lbs. under conditions even more rigid than those used for bell and spigot joints."

Coatings for Pipes

"As one of the major projects in the investigation of coatings for pipe lines, which is being made by the American Gas Association in cooperation with the Bureau of Standards, specimens of 42 types of coatings were buried in a total of fourteen carefully chosen locations," said Dr. Scott Ewing. "The first group of these specimens was removed from eleven locations after a period of burial of about nine months. Some specimens of coated pipes, which were prepared and buried by the Bureau of Standards, were removed after a period of of burial of about 6 years. A third group of specimens which were prepared and buried by the United Gas Improvement Company were removed when the A.G.A. specimens were removed after a period of burial of 17 years. These specimens were subjected to various tests, measurements, and inspections at the Bureau laboratory.

"This report is concerned with the results obtained from the study of these specimens. The purpose of the study is to develop satisfactory methods of testing coatings by determining the causes of failure of coatings and by observing the condition of the various types of coatings, after various periods of burial.

"A method of showing the distribution of pinholes over the coating surface has been devised. No pits have so far been found under coatings which do not develop pinholes and pits have been observed under some coatings which do show pinholes. There are very great differences in the protective value of coatings as measured by either electrical conductance of the coating or by pinhole density on the coating surface. There is a rough relation between electrical conductance and pinhole density.

"All organic reinforcing materials are decomposed to a greater or less extent in the soil, depending upon the nature of the soil and upon the degree of protection of the fabric.

"The following conclusions are based on the first set of A.G.A. specimens which were buried for about 9 months, some specimens of coatings buried by the Bureau of Standards and removed after 6 years and a few specimens buried by the United Gas Improvement Company and removed after 17 years. The coatings in these groups do not correspond with each other and the last two named groups are not proprietary products. Inasmuch as most of the data contained in the report is based on only the first group of A.G.A. specimens which have been buried but a short time, these conclusions must be regarded as tentative and subject to revision when other specimens are removed. No specimens in the A.G.A. test have been removed from alkali soils. It is possible that these soils may have some peculiar action on the coatings which will later require a modification of the conclusions.

1. The coatings which develop numerous pinholes after a short period of burial are usually thin. They show some protective value in well drained soils for a limited time. They are of value on temporary lines because they prevent general rusting for a time. They will not increase the ultimate life of the pipe appreciably and they are practically useless in poorly drained soils.

2. Coatings, which show a limited number or no pinholes after a short period of burial, are usually thick and they offer better protection than the thin coatings. The thick asphalt coatings do not prevent a slight surface rusting on the pipe but so far no appreciable pits have been found under any of these coatings. Thick coatings can be so designed that they will not develop pinholes after 9 months in the most severe soils and indications are that pinholes will not appear for a considerable time.

3. The thick coatings develop pinholes principally because of the mechanical effect of the soil on the coating and failures occur more often where the soil has the greatest mechanical action on the coating. The pitting under thin coatings is not primarily dependent on soil distortion because these coatings show numerous pinholes in all soils.

4. The organic reinforcing materials are decomposed to a greater or less extent by bacteria and fungi in the soil. The extent of the rotting of these materials depends upon the nature of the soil and upon the extent to which they are protected with bitumens or disinfectants. The two tidal marshes are the least destructive to fabrics while the muck at West Palm Beach is the most destructive soil in the A.G.A. tests.

5. Unvulcanized rubber appears to be unsuitable for pipe coatings because it suffers plastic flow. There appears to be little chemical deterioration in the samples of rubber so far removed.

6. The pinhole test appears to be the best method the writer has so far found for determining the condition of the coatings in this test. The conductance of the coating after it has dried out is a rough qualitative way of measuring this condition. The data indicate that the pinhole-conductance relation is independent of the type of exposure and the type of coating.

7. It is difficult to determine the relative merits of pipe coatings by means of visual inspection unless the ratings describing the separate effects of the exposure of the coating are combined into a single quantity. The chief weakness of any rating scheme is the difficulty of assigning proper numerical weights or values to the several factors entering into the rating scheme."

Gum Formation in Distributed Gas

"Coke-oven gas, gum troubles," said Mr. W. L. Shively, "are characterized briefly by the progressive formation of a minute quantity of gummy or resinous suspensoid of extremely fine particle size in the gas, after it leaves the manufacturing plant and during the process of storage, transmission or distribution. This suspensoid subsequently deposits in appliances in such a manner as to impair or prevent their normal functioning.

"The absence of any gum in the gas at the manu-

facturing plant and its formation during transmission and distribution are properties which are apparently difficult of acceptance. Exceptions have been noted to this general rule, in that gum has been found in the gas at the outlet of plant holders; but this is distinctly the exception rather than the rule. Broadly speaking, gum is found in 'old' gas, and a time factor must usually elapse between the manufacture of the gas and the appearance of any gum, as such. Of course, the original or potential gum-formers are present in the gas; but these are harmless in themselves as they are gases or vapors.

"The minute quantity of material involved greatly delayed definite recognition of the problem and has increased the difficulties of effective work on its solution. The largest amount of gum we have ever found was of the order of 10 milligrams or 0.15 grains per 100 cu. ft. of gas. This minute amount is sufficient to cause very acute trouble in domestic appliances. Actual tests show that only 2.7 milligrams of gum per 100 cu. ft. of gas will cause an outage on a range lighter in from one to two days and even as small a quantity as 0.8 milligrams will tend towards slow outage of such a lighter.

"The progressive nature of the formation of gum in the gas is rather difficult of proof; but is indicated by a large mass of related data. It was thought at first that the supposed extreme persistence of the gum particles was due to their very minute size. However, to possess a persistence in accord with their known life as suspensoids in the gas, they would be almost incapable of removal by any filter and would scarcely deposit as they do when the gas is throttled or subjected to a rapid change in direction. As will be shown later, gum particles can be filtered from gas. The presence of gum particles in gas after it has travelled many miles in a transmission system, and especially the gradual increase in concentration of gum which has been observed in certain cases, point to the progressive nature of process of gum formation in and precipitation from, the gas.

"New deposits of gum are of a tacky, viscous consistency similar to fresh varnish. In some cases the deposits, even when just deposited from the gas are dry, granular, and resinous.

"The evidence to date also indicates that gum formation must be attributed to a group of compounds rather than any individual constituent of coke-oven gas. Furthermore, all of the potential gum-formers in coke-oven gas do not undergo the gum-forming reaction and separate from the gas as gum. Possible gum-formers are commonly present in the gas in a concentration manyfold that of the quantity which is necessary to account for the small concentrations of gum which are actually found.

"As to the chemical nature of the gum itself, an exact answer is (at present) also not possible.

"The adverse effects of even a small amount of gum in gas, which is to be utilized for distribution to domestic consumers, have been described and are seen to be such that any measures which will prevent or reduce gum formation warrant careful consideration. The measures to be described flow naturally from a consideration of those factors which tend to cause gum trouble.

"It was found that steam injection at a single point approximately ten miles from the manufacturing plant at the rate of one pound of steam per M cu. ft. of gas (line pressure) resulted in almost completely gum-free gas at the end of the line, and that two points of steam injection caused complete elimination of the gum. It was observed, however, that upon expansion of the gas into a waterless holder, some gum appeared in the outlet gas from the holder. Further rehydration of the gas at the holder inlet, to compensate for the expansion from transmission pressures, resulted in reduction of the gum content at this point to only a fraction of a milligram per 100 cu. ft. The number of gum complaints in the distribution system supplied by this gas was reduced 90%.

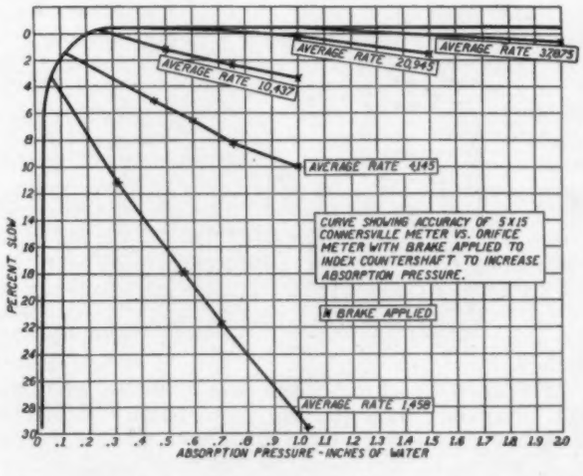
"It was found later that substitution of water, injected in a very fine spray or mist was substantially as effective as steam, and this is the method now in operation. It is not essential that the gas be maintained in a fully saturated condition. Humidities of from 80 to 95% are satisfactory. This explains why dehydration does not give rise to gum trouble; since dehydration plants are commonly controlled to give a gas of approximately 85% saturation at the low temperature of the distribution system. While it is difficult to fix an arbitrary value, it appears that humidities less than 50% are required before a tendency toward gum formation is evident."

Committee on Meters

Under J. E. Overbeck the committee studying meter problems for the Distribution Committee reported on several investigations which it has completed. Among them material of considerable interest is summarized on tests of impeller type meters, the use of semi-chrome leather for meter diaphragms, and the testing of large meters in place.

Tests of Impeller Type Meters

"Several of the members of the Meter Subcommittee have had experience with the impeller or rotary type meter and all are very well in agreement on their experiences to date. It seems to be the general opinion of the subcommittee that this type of meter is a good type for the certain uses on large volumes that exist in manufactured gas companies for measurements of large volumes such as station meter, plant sendouts, etc.


AVERAGE RATE 32,075
AVERAGE RATE 20,943
AVERAGE RATE 10,437
AVERAGE RATE 4,145
CURVE SHOWING ACCURACY OF 5 X 15 CONNERSVILLE METER VS. ORIFICE METER WITH BRAKE APPLIED TO INDEX COUNTERSHAFT TO INCREASE ABSORPTION PRESSURE.
W BRAKE APPLIED
AVERAGE RATE 1,458
PERCENT SLOW
ABSORPTION PRESSURE - INCHES OF WATER

"For general use, as a customer's meter, the characteristics are somewhat unknown to many of the gas companies, and they are rather hesitant in using this type of meter. However, the characteristics are becoming better known as more of these meters are used. It is believed by the Meter Subcommittee that these meters are accurate under certain conditions; that is, at the higher rates of flow where the so-called slippage or leakage around impellers is of no consequence; also

where the differential pressure across the impeller is no greater than the normal differential for any particular flow, as shown by the manufacturer of these meters.

"Many gas companies have made tests on this type of meter and all seem to report about the same results; that is, they are accurate above the rates of flow where the slippage is no factor and where the impeller differential pressure is not abnormal or above the normal operating differential pressure."

"For the purpose of making it possible to visualize the possible error which may exist, a graphic chart is presented which forms a part of some tests conducted by one of the large gas companies. The chart of test results indicates the change in meter proof with an increased (abnormal) absorption or differential pressure across the impellers for the same rate of flow through the meter. It is at the low rates of flow that the greatest change in proof with increased or abnormal pressure is indicated."

Use of Semi-Chrome Leather for Meter Diaphragms

"The use of semi-chrome leather for meter diaphragms was reported on by last year's Meter Subcommittee and it was realized by that committee that the only way to obtain definite conclusions as to the superiority or inferiority of semi-chrome leather would be to follow it through from year to year until it has been in service for a complete periodic change cycle. Reports from the users of this leather, obtained this year, again indicate that it is giving satisfaction and no defects have yet developed. Many of the users of this leather have reported that where they had been having bad gas conditions, the semi-chrome leather was found to be far superior, while it is believed that where good gas conditions exist, this change may not be justified.

"The Meter Subcommittee does not feel that it should recommend the use of this leather at this time. However, more companies are reporting each year that this leather is superior for certain gas conditions."

Testing Large Meters in Place

"Many of the large natural gas companies have made tests of the relative accuracy of the Pierce critical flow and low-pressure orifice type provers versus other types of field meter testing equipment, and they have found that these two types are well within the limits of accuracy of any other type. An item of value which may be mentioned regarding the low-pressure orifice type meter prover is that tables are now available for computing the flow through the prover for whatever differential pressure may be selected between 5 and 10 in inches in water column. This is a decided advantage over the old method, especially in cases where inlet meter gates or valves are such that it is almost impossible to obtain the exact differential pressure necessary with the old method.

"The members of the Meter Subcommittee, who have had experience with testing large capacity meters in place, feel that either of the three methods—by the use of the test meter, Pierce critical flow prover and the low-pressure orifice type prover—is accurate for testing meters in place. It is the understanding, however, that there is a dividing line between when meters should be tested in place and when they should be removed and returned to the meter shop. This dividing line will vary depending on local conditions, such as, capacity of meters, distance from the meter shop, meter shop facilities, etc., in order to ascertain which will result in the most accurate and most economical method."

Gas Meter Diaphragm Dressings

"The object of the investigation," said Mr. J. F. Anthes, "was to determine by accelerated tests the ability of the dressings to remain in leather when exposed to the light oil in manufactured gas. These accelerated tests indicated that all of the dressings tested would in time be removed by the light oil in gas, some more readily than others."

"From the investigation which the committee conducted it appears that after a meter has been operating for a brief period the diaphragm dressing scrubs the light oil from the gas. The dressing which has been diluted with the light oils soon begins to drip from the leather, its rate of removal being accentuated by the reduction in viscosity due to the light oil dilution. This process continues until all of the dressing is removed, and the leather is said to be bleached. The removal of the dressing is rapid at first, and then slows down considerably. If the meter is chilled so that light oils actually condense on the leather the loss of dressing is greatly increased. After the dressing has been removed the leather, being unprotected, is apt to be weakened or destroyed by the absorption of corrosion products formed by the action of the gas and moisture on the tinned iron meter. Marked advantages may be hoped for by the use of semi-chrome diaphragms."

"A perfect dressing would lubricate the leather, be unaffected by the light oils in gas, and remain indefinitely unchanged. The choice of a leather dressing which will meet these specifications is a problem presenting many difficulties. The substances which the committee decided to investigate this year were lead oleate and boiled linseed oil. These substances were selected after a careful consideration of the various possibilities."

"Diaphragms were treated with lead oleate and boiled linseed oil and, after being aged one month, were placed in meters. Two types of meters were used, a tinned iron meter and a cast-iron meter. From the meter tests it is evident that the lead oleate dressing increases the pressure loss and cuts down the capacity of the meter. The pressure loss and decrease in capacity were more pronounced in the case of the 50% lead oleate dressing. The cast-iron meter was found to be affected to a greater extent than the tinned iron meter."

"The lead oleate (lead oleate 50%—benzene 50%) and boiled linseed oil dressings were both found to render the leather gas-tight.

"The lead oleate (lead oleate 50%—benzene 50%) and boiled linseed oil dressings withstood the action of manufactured gas containing benzene and of natural gas containing heptane."

"The committee recommends that this investigation be continued along the following lines:

"1. A study of the effect of modifying the compositions of the dressings used in these tests.

"2. A continuation of the tests made with boiled linseed oil. These tests should be run over a considerable period of time for the purpose of determining how diaphragms treated with boiled linseed oil will act on aging. It seems advisable to use meters in all future tests, and to determine the changes in operating characteristics of these meters over a period of one year or more."

High Rating Producers

"The Producer Gas Committee," said Mr. F. P. Pfluke, "presents this brief discussion of what is being

done by representative companies of the gas and by-product coke industry. It was thought advisable, at this time, to limit the study to outside producer installations.

"It is first necessary to define the meaning of High Rating Gasification. In general, normal operation the capacity of a producer is considered as 35 to 40 lbs. of wet producer fuel consumption per square foot of cross sectional producer area. Ratings in excess of this amount will, for sake of argument, be called High Rating Gasification.

"Of ten companies who replied to a questionnaire sent by the committee, the highest rating at which any plant normally operates is 49 lbs. per sq. ft. This operator produces an excellent quality gas of 141 B.t.u. The fuel size is about 9% on ¾" screen, 62%, ¾ x ½"; 29% through ½" of which 8% is through ⅛". This is an excellent size fuel for producer operation.

"The highest rating obtained by any of the ten companies was a test run of 48 hours duration at a capacity of 75 lbs. per sq. ft. of area. The fuel used was 59% over ¾", 35%, ¾" x ½" and only 6% through ½". The carbon loss during this test was very high, being 29%. (Air port area 265 sq. in.)

"The highest rating for a long test was 67 lbs. per sq. ft., which was obtained over a period of one week. The fuel size used for this test was .4% over 1", 19%, 1" x ¾"; 30% ¾" x ½", 22% through ½" of which 15% was through ⅛". This is a remarkable rating with a fuel of such high breeze content, especially since the combustible loss was only 8% and no operating difficulties were encountered.

"In general the tendency seems to be to use a smaller fuel, particularly the size between 1" and ½" which averages 57% for the plants considered. Ratings are also being increased considerably. The average rating reported in 1927 by five of the plants, who answered the 1931 questionnaire, was 31 lbs. of dry fuel per sq. ft. of grate area. This average rating is now 35 lbs. or an increase of approximately 13%. No doubt, as these plants expand the operating rates will increase since test runs indicate that ratings of 70 lbs. of wet fuel per sq. ft. of grate area are perfectly possible."

Chemical Carbonization and Water Gas Reports

Much of the valuable material presented at the Production Conference of A.G.A. is now available in printed form in the reports of the Chemical Carbonization and Water Gas committees. Since this material has been reviewed in extended abstract in American Gas Journal immediately following the Production Conference it does not require further report here. Interested persons should, however, secure the complete reports for study and reference.

Industrial Gas Section

LOOKING over the program of this section one is forcibly impressed by the high standing of those gentlemen who delivered papers and addresses at its two sessions. In keeping with the trend of the times natural gas and manufactured gas phases of this very important branch of utilitization were dealt with. Research, the growing competition with other fuels, as well as the manufacturer's estimate of the value of gas as a fuel, and advertising received their due attention. Chairman Chapman is to be congratulated on a fine meeting and an equally fine and enthusiastic turn-out.

A. J. Peters, Chairman-elect, Industrial Gas Section

Natural Gas Industrial Problems

Some fine points were brought out in the paper, "Sales Problems of the Natural Gas Industrial Salesman," by Mr. F. B. Jones. In this presentation Mr. Jones traced the sales policies of natural gas companies from former days and its growth into problems which are in many cases different from those experienced by manufactured gas. Such problems included the matter of load factor and increasing competition with other fuels. Regarding this competition he analyzed and showed why "industrial gas salesmen are necessary in the natural gas industry."

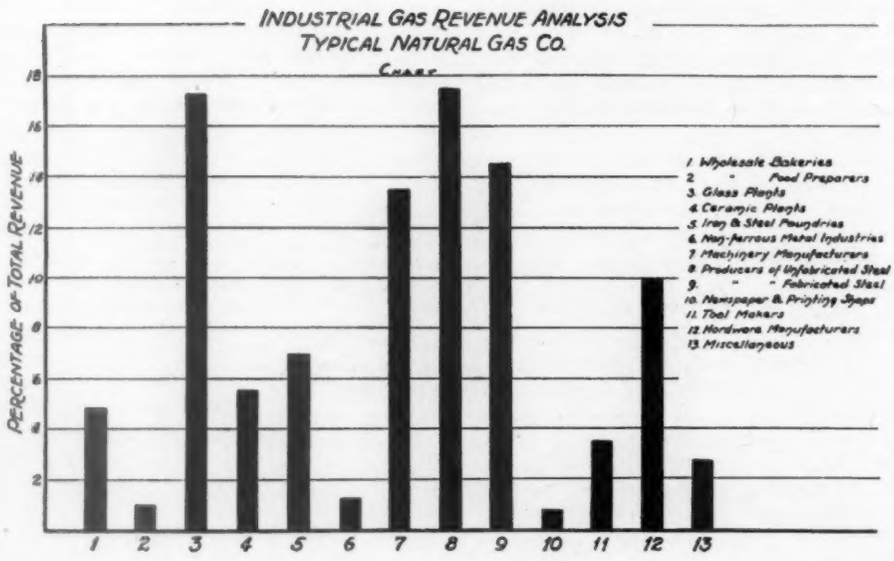
"Chart No. 1 shows the classes of industries usually found in natural gas territories; also the relative amounts of annual revenue secured from each of these industries by a typical natural gas company.

"A review of the changes and the competition that the natural gas industrial salesmen have been experiencing in this list of industries would constitute sufficient material for a paper by itself. But by way of illustrating the competition that the natural gas industrial man is facing today for markets, I wish to call your attention to a few of the problems involved in selling gas to only some of these industries.

"First, let me say that the wholesale bakery, wholesale foodstuffs, machinery manufacturers, newspaper and printing fields, and hotels and institutions, are pretty well saturated in most natural gas districts. Unfortunately, these industries and others of similar type only constitute a small portion of the present and potential

market which is available and needed in natural gas districts. The glass, ceramic, iron and steel foundries, producers of fabricated and unfabricated steel products, and high-pressure boiler users, constitute a very large percentage of the present and potential industrial load.

"A few years ago, glass plants were often located with an eye on the nearness of a natural gas supply. However, within recent years they have learned to use producer gas and fuel oil quite successfully to melt glass. Due to natural gas supplies not being wholly reliable a few years ago, these glass consumers found it necessary to install duplicate fuel systems to burn either natural gas and producer gas, or natural gas and fuel oil.



"The utilization efficiency of natural gas in glass furnaces is frequently reduced on account of these dual furnace designs. In many cases the furnaces are primarily designed for producer gas and burn a natural gas in the same furnace with only minor changes. It is very easy then to see why a good natural gas salesman is needed to contact this industry, when one considers that today in many natural gas districts, fuel oil and bituminous coal suitable for such operations can be purchased for three to four cents per gallon, and $1.50 to $2.50 per ton respectively. In addition, many glass plants already have a producer gas or fuel oil system installed and are unwilling to consider fixed charges on such equipment when comparing costs with natural gas operation, and in this position I believe they are justified.

"The conditions in the plants of producers of fabricated and unfabricated steel are in many cases similar to those prevailing in glass industries. These plants have large potential loads in their open hearth, reheating, forging, and annealing furnaces, but likewise, they have low-priced coal and oil available.

"In the plants that have medium-size high-pressure steam boilers in operation for process purposes, large volumes of natural gas load have been lost to the older natural gas companies. The brick and ceramic industry, which one time consumed large quantities of natural gas, has been forced to find a cheaper fuel where possible. Bearing in mind that a large portion of the loads available from these heavy industrial operations is essential to smooth out the annual load curve of most old natural gas properties and to make the large investments of both the new and the old natural gas properties a profitable operation, then it is apparent why good and aggressive industrial salesmen for natural gas properties are needed."

Mr. Jones enumerated the differences in the sales problems of the salesman in the natural gas and industrial gas community. These included such items as the size of installation, wherein natural gas industrial users employ furnaces requiring a much larger volume of gas than is the case with manufactured gas; then, the combustion characteristics of the two gases are different and, in this regard, the natural gas man has to contend with manufacturers of gas equipment who insist on trying to develop burners that will accommodate both gases without any material change in the burner design; also, the type of applications are different, to say nothing of such matters as supply, service and off-peak loads.

Touching upon rates he observed that "it is one of the important problems, in the natural gas territories, for the industrial men to promote the development of rates that will protect the investment in natural gas facilities dedicated to the customers' service and hold the customers definitely responsible for the demands that they create and for which the company must provide."

Regarding the problems attendant with heavy heating operations he enumerated the following:

"1. The technique of developing more radiant heat from a natural gas flame for use in such operations as steel and glass melting, heavy forging, annealing, and ceramic firing.

2. The proper and most economical air and gas port design for the regenerative furnaces to best utilize the available furnace volume.

3. The best method of controlling the air-gas ratio in regenerative furnaces.

4. The matter of reversing the furnaces on a time cycle or on an automatic temperature basis.

5. The influence of different air-gas rations on the material being heated which may be steel, glass, or some other metal.

Mr. Jones recommended expansion of natural gas advertising and the development of the romantic side of the natural gas industry by way of printed matter. He also cautioned against the employment of inadequate sales forces.

He outlined a scheme whereby the American Gas Association can be of greater aid to the natural gas industry. This follows.

"1. Prepare a special study of the elements of cost for producing and supplying natural gas to all classes of consumers and publish in a popular way for general distribution to the public.

"2. Establish a special committee under the Industrial Gas Section for the purpose of studying the possible off-peak or summer.

"3. Direction of more of the Industrial Gas Research activities to bear particularly on natural gas utilization problems such as:

a. Collecting and publishing in one place the essen-

tial combustion characteristics of natural gas compared to various types of manufactured gas for the guidance of builders of natural gas industrial appliances and burners.

b. Specific utilization research on widely occurring natural gas applications as glass melting tanks, high pressure steam boiler conversion, regenerative furnaces, and open hearth steel melting.

c. Natural gas slanting of some of the present research activities, as the projects on burner noises, recuperation investigation, furnace volumes, and large size short tunnel burners."

Industrial Gas Competition

Henry O. Loebell sounded a warning as to the reasons for and what form competition with industrial gas will assume in his fine paper, "Meeting a New Era of Competition in the Sale of Industrial Gas."

Tracing the great growth in the use of gas for industrial uses he said:

"If we carefully analyze the underlying reasons which made it possible for us to secure an industrial load during the past several years, we can enumerate the following:

"1. Industries' need for a clean fuel that could be readily utilized under controlled conditions.

"2. Low cost of natural gas.

"3. Limited competition from other refined fuels.

"4. Technical research in applying gas to industrial processes and the development of proper utilization equipment.

"5. The establishment of industrial sales activities by the gas company.

"6. Advertising, publicity and the activities of our National Association.

"Of the above reasons by far the most important is the industries' need for a refined fuel that could be readily utilized under controlled conditions. Gas has, without doubt, supplied this need. Coupled with it is the fact that no strong competition from other refined fuels was developed."

Relative to quantity production of manufactured goods using fuel and its bearing on fuel costs he noted that "industries in the past decade have been obsessed with the idea that large quantity production automatically spells low costs. It is true that in the transition from small rates of production to larger units and capacities, the items entering into the cost of production were not as closely scrutinized as they might have been, as long as the results were lower production costs.

"During this period, with the motif of large quantity production, two important elements helped the acceptance of gas.

"1. In the transition to larger production capacity the savings effected were large enough to satisfy the owners even if a more expensive fuel were used.

"2. The contingent liability of using other fuels than gas, the technique of which was not developed, gave gas the preference, and the failure of an agency to present the case of fuel oil, helped the gas salesman carry the day."

"The specific problem before us," said Mr. Loebell, "involves a new era of competition, due primarily to two reasons as follows:

1. More competitive fuels are becoming available at lower prices.

2. The differences that have existed in the past in the utilization value of competitive fuels and city gas are decreasing."

Continuing he brought out that "as we carefully analyze our situation in the light of the new competition *we face the fact that the solution of our problem must come through the lowering of the spread in B.t.u. cost between central station gas and other competitive fuels that exists at the present time.* There is no alternative. The methods we have used in the past to secure the business will only be of secondary value. If we are going to maintain our position in the industrial field and secure our portion of the new business that will become available, we must analyze our problem in the light of lowering the price at which we can sell our service to manufacturing plants.

"Unless we can sell the industrial fuel at a price that will be less than the cost at which an industry can use a competitive fuel, our service to that industry will cease and the business from the standpoint of the central station will eventually be lost."

Mr. Loebell advanced the following suggestions for meeting the new competition:

"Lower gas production costs

"The need for more flexible rate structure policies

"Classified or selective industrial load

"Greater co-ordination with other fuel agencies."

In summarizing he said in part:

"In looking towards the future we have a most important condition in our favor. We can greatly increase our domestic business through the greater sale of gas house heating equipment. This will be further amplified by our ability to enter the house cooling field in a major way. I say this because the engineering developments to date in connection with producing a house cooling machine which will meet the necessary requirements has reached the point where it is just a matter of time before gas house cooling will become an important industry.

"These two classes of business can be sold on a rate basis that will pay nearly all the investment charges necessary in supplying that service. In addition, this great potential load which the gas company will be able to secure will represent a load factor probably somewhere between 25-40%. In other words, while the investment charges on the plant will be more or less completely paid for, this supply of gas will be available from 60-75% of the time during the year and can be sold therefore as dump load fuel at a price which merely represents production cost with practically no overhead charge or, at the least, a very small fraction of the total investment burden.

"In many cases, therefore, the cost at which such gas load can be sold to industries can be low enough so that neither butane, fuel oil, producer gas or any other fuel will be able to compete. This opportunity immediately becomes possible if we can extensively develop a domestic business which will carry most of the burden charges and put us in a position to capitalize on our opportunities of selling classified and selective load."

The Logical Fuel

Mr. Morse DellPlain's address, "Gas Is the Logical Fuel," was well received and treated of a number of problems to be solved if progress is to be continued. Some of the high lights of his address are given herewith.

"The time is not here, nor will be for quite some time yet, when we can sit back and bask in the glory of a job successfully completed. Before we can attain our final

objective there is a long road to be built. Customer resistance has to be broken down, and the obstacles of competition have to be overcome before we can feel and know with certainty that gas has been accepted as the logical fuel for use universally in the thousands of ways for which it is ideally fitted."

"A strong, aggressive sales policy—real salesmanship in the most complete sense of the word—was never so necessary as it is today. Some may say that this is not the time for pushing an aggressive sales policy; that money expended in such a way now is money wasted, but I cannot agree with them. The end of this dip in the business cycle will mean a different line-up of affairs. Whereas our customers and prospective customers may have more money, they will have learned during the lean days that every dollar has real value. It will not be possible to reach these people with the same appeal that we used in the boom days. We will have to show them that our service and our appliances are a definite asset in their lives."

"A sound dealer cooperation plan is a very vital factor in breaking down sales resistance. Briefly, sound dealer cooperation means to me making it more profitable to the dealer to sell and install gas appliances than those using other fuels. Sound dealer cooperation does not mean that the gas utility need go out of the merchandising business; as a matter of fact, generally speaking, the plumbing and heating dealers and contractors do not want us to stop merchandising, but they do want us, and I believe they have a right to expect us to so plan our selling policies as to provide that they shall receive for their goods and for their work satisfactory prices and meet only fair competition, while we secure what we are primarily interested in—proper volume and correct design."

"An adequate advertising campaign which features a liberal use of space in local newspapers is an important part of every aggressive sales program. Our story must be kept before the public continuously and the keener the competition, the oftener the story must be told and the more ingenuity must be used in presenting it."

"An intensive domestic load is responsible for the degree of stability which has so favored us as an industry. We must further build up and retain this stability by concentrating our sales energies on the domestic field. We will have gone far and accomplished much when we convince the American public that gas home heating is as necessary in their lives as the automobile."

"Gas, like most faithful, dependable servants, lacks spectacular appeal, and therefore its promotion requires a more energetic and aggressive sales effort. A maximum of sales energy should be put into the sale of gas heating, gas refrigeration, and into the seeking of new ways to build up the gas load.

"I do not wish to suggest that in the case of combination companies, the effort to secure additional electric load should be neglected, but I do suggest that the sales effort should be directed toward securing the maximum use of electricity for light and power—its logical application.

"I am firmly convinced that for every dollar expended in sales effort, there is a greater return to both the consumer and to the combination company through a policy of promoting electricity in the light and power fields and promoting the use of gas as the logical fuel."

"The gas business is not a complete monopoly and a fair return upon a fair value of the property cannot always govern the rates charged and still secure for us the maximum volume of desirable load. The industry can very properly give attention to its rate structures more with the idea of meeting competition than of paralleling costs. We will have to be fully alive to the fact that we have competition of a very definite kind from other fuels which are today being marketed at greatly reduced prices. We must be prepared to meet this competition with rates of a distinctly promotional type."

The Management and Industrial Sales

"Industrial Gas Sales from the Management Viewpoint," by Mr. Theodore V. Purcell, reviewed the growth of the industry from the days of gas lighting to its present diversification of services. With reference to househeating and its inter-connection with the industrial load he said that, "whether we like it or not, the demand for househeating seems to be here to stay and we are, in consequence, confronted with large and growing winter peaks. Here is a problem that will call for managerial ability of the highest order, and the burden must be carried by the industrial sales engineer.

"It would seem that there is no way of offsetting the house heating peak except by off-peak industrial business.

"There are many industrial processes, such as brick making, lime burning, etc., having very large fuel requirements but where the cost of the fuel must be kept down to a minimum because it is the largest item of expense in a very crude product. This class of business, in which may be included the enormous field of steam making, has been considered out of our reach. No one has been able to find a way of pricing gas for all year use so as to compete with the cheap fuels used in these processes. But what a wonderful opportunity they present for leveling a load curve already out of line on account of house heating.

"Now this off-peak business will not be handed to us; we must get out and get it. First of all we must cut our prices under the cost of other fuels. We must price our gas so that manufacturers will be willing to undertake the trouble and expense of changing fuels at the beginning and end of the off-peak season. No doubt, in many instances, we will find that the competitive price is a very low one indeed, but if it will yield any amount, however small, over and above the out of pocket expense, it will be good business."

Coming to the question of rates he noted:

"Assuming that the very important questions of rates and equipment have been given due consideration, management must frankly face the fact that no gas company can expect to acquire any considerable industrial load without the aid of an efficient industrial department. Attempts to take on this business through the occasional efforts of men not specially trained will be very unsatisfactory and will generally result in failure. A management having decided to promote industrial sales should at the same time decide to make a reasonable appropriation for the maintenance of a suitable sales organization."

The following concrete suggestions for aiding the growth of industrial business were advanced by Mr. Purcell.

"A survey of all potential business in the territory is of first importance. It may safely be said that this will invariably disclose many opportunities for new business not heretofore known to exist. Such a survey is

valueless unless it includes detailed information as to present methods of conducting heating operations in all plants together with up-to-the-minute data on fuels used and the attendant costs of utilizing these fuels. In addition to this information, there should also be a description of the equipment that would be recommended if the operation were to be carried on with gas as a fuel; a set-up showing the probable operating costs with gas; and an itemized evaluation of the collateral advantages that each customer would obtain through the substitution of gas for the present fuel.

"It is obvious that preparation of such records can be had only through the employment of trained sales engineers who have a reasonable familiarity with the many and varied heating processes used in industry, and a complete knowledge of the suitable gas-fired equipment which is available.

"These sales engineers must also be fitted by training and temperament to take advantage of every opportunity to assist in the solution of the customer's heating problems and should be able to give definite instructions as to the procedure to be followed in overcoming any difficulty which may have arisen.

"The industrial organization must be competent to make studies of competitive prices required to take on prospective business. It should be expert in the choice of rate forms and the provisions of rate contracts. It should keep up to date on all developments in gas utilization and industrial processes, and take full responsibility for suggesting to the management any changes in rates, policies, or procedures necessary to increase the volume of business of the company or to strengthen its position as a purveyor of fuel service.

"Having considered the required qualifications and the duties and responsibilities of the industrial sales personnel, we cannot fail to be impressed with the fact that no matter how perfect this organization may be, the results will not measure up to possibilities without the whole-hearted support of the management.

"To begin with management must thoroughly believe in the desirability of taking on industrial business. It must realize that the promotion of industrial gas sales cannot be accomplished without liberal appropriations for salaries, demonstrations, trials, research, and for the development of equipment.

"Management must throw overboard preconceived ideas of what gas service is worth and devote itself to the task of finding out what industry can afford to pay; and finally it must get away from the atmosphere of the monopolistic, non-competitive enterprise in which we may at one time have been engaged and realize that our business now is just as competitive as that of any manufacturer or merchant in our community."

Theodore V. Purcell, vice-president of The Peoples Gas Light and Coke Company, Chicago, Ill., received one of the highest honors open to members of the gas industry when, at the convention of the American Gas Association, he was presented with the Charles A. Munroe Award for pioneering and constructive leadership in rate making; for focusing attention upon gas industry's economic policies to this end. The award consists of an engrossed certificate and $500.00 in cash.

The presentation took place at the evening session of the Association at the Atlantic City Auditorium, attended by several thousand delegates and was made by Charles A. Munroe of New York, past president of the Association, who established this award.

The accomplishment which won the award for Mr. Purcell resulted from his studies in the development and application of business-getting gas rates; he has been prominently identified with the rate work of the Association since its organization.

Mr. Purcell was among the first men to recognize that rate making is one of the principal functions of gas company management, and he has been instrumental in securing general appreciation of the fact that the initiative in rate making must lie with the management and that, unless it exercises this office intelligently, and with full regard for the public, as well as the utility, it fails in one of its greatest duties.

Mr. Purcell's contributions in the form of rates, papers and addresses on the subject of rate making have been many and of great value to the industry. What he has said on this subject is a text to students of rate matters.

As Chairman of the Committee on Domestic Load Survey through reports and addresses, Mr. Purcell is said to have been instrumental in focusing the attention of the industry on the necessity of adopting comprehensive steps to conserve the present and increase the future sales of the industry in all of its branches.

Excellent Research Work

It should be gratifying to know that research work in a number of lines is progressing so favorably. These efforts were described by Mr. N. T. Sellman in his paper, "Industrial Gas Research and Its Relation to Gas Sales."

He briefly referred to the application of gas heat to forging, bread baking, bright annealing of brass and other metals, baking sand cores, stereotype melting, short cycle malleableizing, sheet steel enameling and firing of ceramic ware, house cooling and commercial refrigeration. These last two items are reproduced somewhat fully below.

"The Research Committee, after a thorough investigation, decided that a dehumidifying cooling system using silica-gel was the most promising method which could employ gas fuel as the principle operating medium. Consequently, two dehumidifying units were ordered for installation—one in a home in Pelham, New York, and the other in Chicago, Illinois. These two silica-gel units supply a slightly cooled dehumidified air to the space which is to be conditioned. A circulating

fan maintains the movement of air through a circuit which includes the conditioned space, the silica-gel unit, and the supply and return ducts. A portion of the moisture laden air returning from the conditioned space is by-passed through a silica-gel dehumidifier and rejoins the main air stream, thus providing a mixture whose moisture content is lower than that of the returned air. The moisture is then propelled through an indirect water cooler which reduces its temperature slightly, and is then distributed by the duct system to the space to be conditioned. A duct equipped with a slide shutter makes it possible to draw in as much or as little outside air as may be found desirable.

"The Chicago and Pelham installations, although with identical equipment, showed somewhat different operating characteristics. These differences were brought about by the different rate of air infiltration in the two houses, as well as difference in temperature and humidity. It would appear from observations made during the past summer that the Chicago climate shows a greater need for dehumidification than that in Pelham. This is manifested by the following record of operating time:

"The Pelham system was in operation for seventy-nine days, this installation being ready for operation as early as June 25. During this entire seventy-nine day period 325 hours of operation were recorded. The Chicago system was not put into operation until pretty near a month later, having only forty-eight days of operation, and during this period was in use 338 hours. One factor, however, had a material effect in reducing the need for air conditioning in the Pelham installation during the latter part of the summer. Approximately August 1, the Pelham house was completely insulated and thereafter there were only four days where the temperature and humidity in the house were such that operation was necessary. In addition to that, local conditions such as shade and exposure have their effect. Computed on a theoretical basis from the period of May 15 to September 15 it would appear that the Pelham system would require 500 hours of operation and the Chicago system 850 hours of operation. Expressed in percentage this would be—Pelham 16.7% of the time—Chicago 28.8%. Continuous operation for more than eighteen hours occurred five times at Pelham and four times at Chicago. High night temperatures accompanied by high moisture condition of the outside air causing extreme humidities necessitated these long periods of operation.

"Both houses are equipped with warm air heating plants for winter operation. The conditioning systems used the same ducts to distribute air, and though the duct systems were not specifically designed for air conditioning they functioned well enough to maintain uniform temperatures and humidities in the conditioned space.

"The house which is not designed to allow the closing off of rooms where a conditioned atmosphere is desired must be conditioned throughout. Partial conditioning of a space open to an unconditioned space will result in an influx of unconditioned air to the conditioned space. Conditioning of the entire house volume would seem most desirable even though the waking hours of the occupants are spent in two or three rooms, because one of the greatest benefits enjoyed by the occupants during the past summer was a comfortable bedroom on hot humid nights. The installation of a conditioning system for bedrooms only would be used so seldom that it would yield a poor return on the investment.

"Both the Chicago and Pelham systems were manually operated; the system only being in operation when the occupants felt that greater comfort was desirable. It would appear that if automatic control is attempted, all doors and windows would have to remain constantly closed, as under these circumstances rapid changes of outside conditions from comfortable to uncomfortable would not be immediately felt inside and the system would therefore not operate unnecessarily. It is also believed that there would be a difficulty of habituating people to keeping all doors and windows closed and this would complicate the problem of automatic control. Considerable educational work would be necessary to make people understand that a house could be maintained more comfortably in summer with a conditioning system if windows and doors were kept closed. However, experimentation is necessary to definitely determine whether operating time is more or less with automatic control.

"The cost of operation per hour of the respective systems after final adjustments and changes have been made appears below:

	Pelham System, 8-28-31		Chicago System, 9-10-31	
Gas	145.5 c.f. at $ .60/M—	$.087	118.8 c.f. at $.78 /M—	$.092
Water	36.5 c.f. at 4.00/M—	.146	53.7 c.f. at .60 /M—	.021
Power	1.5 kw. at .04/kwh—	.060	2.39 kw. at .037/kwh—	.088
Total hourly cost.....		$.293		$.212

The gas consumption is higher and the power consumption lower in Pelham because the Pelham system treated 25% more air and circulated 80% less, therefore, requiring more gas for reactivation and less power for the circulating fan. The Pelham system's water consumption was reduced to a rate only sufficient to keep the house temperature from climbing. Cheap water in Chicago made this refined regulation relatively unnecessary. As an illustration of how existing unit costs of power, gas, and water affect the cost of operation the Pelham unit costs are applied to the Chicago consumptions and vice versa. A comparison of total cost appears below:

	Pelham System		Chicago System	
Gas	145.5 c.f. at $ .78/M—	$.114	118.8 c.f. at $ .60/M—	$.071
Water	36.5 c.f. at .60/M—	.021	52.7 c.f. at 4.00/M—	.211
Power	1.5 kw. at .37/kwh—	.055	2.39 kw. at .04/kwh—	.095
Total hourly cost.....		$.190		$.377

You will note that by merely changing the relative rates but maintaining the units of consumption the Pelham system is reduced from 29.3 cents per hour to 19.0 cents per hour, and the Chicago system raised from 21.2 cents per hour to 37.7 cents per hour. Even with Chicago's low water rates it appears most important that water consumption must be either materially reduced or preferably eliminated.

"In my opinion the next step is to develop an air cooled silica-gel dehumidifying unit coupled with an air cooled silica-gel water vapor refrigerating unit for the purpose of lowering the temperature of the circulating air. This system would be a good load builder for both gas and electricity and be entirely void of the usual restrictions to which large refrigerating systems are subjected. The water used in the refrigerating portion of the system would be of little consequence.

"Even should this development be difficult of accomplishment the prospects for summer air conditioning for domestic residences are still as favorable as they were before the recent installation. The past summer's work has demonstrated that dehumidification with but slight lowering of temperatures is feasible and from the point of view of those who experienced it, it is a desirable adjunct to the home. Improvement of operating char-

acteristics and reduction of installation cost are needed to place summer air conditioning within the reach of the public.

"A third installation of different design was made in Dallas, Texas, but was not completed until the end of the past summer so no operating information is available. A brief description of the Dallas system is of interest because it embodies a different application of the silica-gel absorption system. In Dallas where relative humidity of the outside atmosphere is consistently low and the temperature high, the silica-gel system supplied air which had been cooled only. The air is circulated as in the other system, the returning warm air, however, passes through an indirect water vapor cooler and is distributed to the conditioned space. The silica-gel unit in this case employs its absorbent properties for producing a water vapor refrigerating cycle. The water from a condenser is expanded to vapor in the coils of the water vapor cooler. The latent heat of evaporation is supplied from the air passing around the coils. The vaopr passes from the cooler to the gel unit where it is absorbed, the action of absorption producing a partial vacuum which induces the motion of the water vapor. The absorbed vapor is revaporized by the heat of steam in the coils imbedded in the gel and proceeds to a condenser, the condensation causing a vacuum which further induces the motion of the water vapor. From the condenser water travels to the expanding coils. Steam is supplied by a gas fired steam boiler. The condensing water is cooled in an evaporative cooler and reused.

"Referring again to furthering the development in this system of air conditioning the next step would be to construct a system which would be a combination of what was installed in the northern climates and that installed in Dallas with the addition that all cooling and condensing be accomplished by circulating air.

"The subject of commercial refrigeration has been before us for some time, but I am happy to report that early developments are to be hoped for as there are now no less than four properly equipped concerns interesting themselves in this subject and have units under development. All four concerns appear to have the correct conception of this problem and are striving to produce a system which will operate on a continuous cycle. Here again air cooling would be preferable, but not an absolute necessity. In the communities where water costs one dollar per thousand cubic feet or more the overall cost of operating an air cooled unit with its slightly lower efficiency would still be less than the cost of gas plus water on a water cooled system. Air cooling reverts the expense of water to some additional gas consumption because of lower efficiency, and in most communities the relative rates are such that the overall operating cost would be less, in addition to other advantages that could be claimed for an air cooled system."

Commercial Section

CHAIRMAN ACKER presided at the meeting of this section which was concerned with such pertinent subjects as rate making, dealer cooperation, house heating, advertising, gas refrigeration, etc. Much valuable discussion attended the exposition of these themes and such comments were not scattered on barren soil, since a capacity was on hand for both sessions, despite very poor ventilation in the meeting room.

Samuel Insull, Jr., Chairman-elect, Commercial Section

Electric Competition

Mr. Hall M. Henry's paper, "Surmounting Competition in the Domestic Cooking and Water Heating Fields," discussed the cooking load as a key to future output, as well as water heating and the growing competition of electricity in these fields.

As regards off-peak heating of water by electricity he called attention to the fact that there are gas water heaters which operate on the same principle.

Mr. Henry clinched the argument that electric competition can be surmounted by way of the following:

"There is little doubt but what electric competition can be completely overwhelmed if we will but properly organize our forces and take advantage of the factors which are in our favor. However, before we can successfully overcome the competition, we must first recognize that we *have* competition, even though it has not yet been *forcibly* brought to our attention. In every encounter of aggressive activity on the part of the electric companies with which I have been acquainted, the gas company *has been entirely successful in repulsing the attempt of the electric company to annex its cooking load* and in fact the electric companies were so decisively licked in their attempt that they have foregone any further effort to take away our domestic cooking load through an aggressive campaign.

"This does not mean, however, that the electric companies have relaxed their efforts. We find them continually contacting dealers and promoting the general

idea that electric cooking is the modern way. The safest policy to pursue is one of assuming that the attempt to take away the cooking load is continually with us, for national advertising of the electric range companies and articles in the national women's publications at various times, recommending electric cooking, are bound to have an influence on your local consumers, even though your electric competitor is not actively soliciting this kind of business.

"Our advertising, therefore, should continually stress the many features of our gas service and constantly point out that gas ranges give every convenience and comfort that can be obtained from an electric range. We must find some way of combatting the insidious inference which the electric industry is constantly flaunting in our faces; that electricity is the modern way. Such statements as the following illustrate how insidious is some of the electric range propaganda.

"Think Back—The Torch, the Oil Lamp, The Tallow Candle, the Kerosene Light, the *Gas Light*, the Carbon Lamps, and NOW, the wonderful Mazda Lamp."

"Raw and dried food, sun-cooking, open fire cooking, the stone stove, the inside hearth, the iron-wood stove, the coal range, the *gas range*, and NOW—the 'last word' in cookery, the wonderful ELECTRIC RANGE."

It would be easy to quote hundreds and hundreds of other similar statements, which by inference would lead the public to believe that there is really something to this idea that electricity is the modern way, when as a matter of fact, the real test of either gas or electricity is the ultimate result which the consumer receives from the use of gas or electricity in a particular appliance. If electricity itself is so wonderful, why then aren't automobiles driven by electricity instead of by gas fuel?

"It seems to me that it is time that our executives of the large combination companies recognized the harmful effects of such propaganda on the gas properties under their control and put a stop to the circulation of this kind of misleading information. If the electric product is so superior as our electric friends would have us believe, then it seems that they would not need to resort to this type of propaganda to put over their idea. We must constantly keep on our guard against the various attempts to deprive us of our cooking load and we must take advantage of every agency at our command in combatting the competition. This means, we must give more consideration to dealer relations and I know that this is receiving the earnest consideration of the industry at this time. We cannot afford to let up on this very important move to bring the dealers in as our allies in the sale of gas. I think it is time that our industry inaugurated a national advertising campaign sponsored, if you please, by the range manufacturers and the gas companies to sell the idea of gas as the modern and most satisfactory of fuels for domestic use. Such a campaign would have a tremendous influence in combatting the false idea which is fast gaining acceptance that electricity is the modern way of cooking."

Why Gas Refrigeration

This paper by Mr. H. S. Christman narrated the progress in selling gas refrigeration from the time the appliance was first exhibited five years ago. Mr. Christman said "the real sales history of the Gas Refrigerator only begins in 1928, when the Consolidated Gas Company of New York succeeded in equipping two fine new apartment hotels of Henry Mandel Company with this refrigerator. Full-page color advertising in national magazines also began that year. So did newspaper advertising in cooperation with several local gas companies. Each year since then sales have increased by leaps and bounds. It may surprise you to know that today there are more than 200,000 gas refrigerators installed in this country. The world's largest apartment house, located in New York, with 1669 kitchens, is completely equipped. So is the largest apartment building in my own city of Philadelphia. Our sales of the gas refrigerator there for the first six months of this year were 192% ahead of last year. In New York I understand that their increase was also well over 100%, and that the sales record of Chicago, and Boston and other large cities is equally satisfactory."

He stated that the gas refrigerator came at an opportune time, demonstrating to the public that the gas industry was capable of originating appliances that had the proper appeal and thereby forestalling electric competition. "This appliance," said Mr. Christman, "has a great dramatic appeal. The story of ice from heat, of freezing with a tiny gas flame, captures the imagination of the public. And the idea of producing perfect refrigeration without sound, without moving parts, and at less cost than ever before, is certainly such a radical advance that the old fashioned shoe is now squarely on the other foot."

He went on to state that the refrigerator load is very desirable. To promote the increase in the sales of gas refrigerators he pointed out the vast help that would accrue by a large volume of the proper advertising. "You know," said Mr. Christman, "of the millions of dollars of advertising that the electric industry is spending right now to promote the idea of electric refrigeration. We have less money to spend than our worthy competitors. We have fewer salesmen on the job, and a later start by several years. So it is vitally important that we get 100 cents worth of value from every dollar of effort. What we have learned is the value of cooperation. Instead of preparing our own advertising along the line of our own ideas, we work closely with the manufacturer on gas refrigeration. By making the same sales points, by saying the same things in practically the same way, and keeping a family likeness in the physical appearance of the advertising, we tie up with the maufacturers national advertising and make it work doubly for us. This also applies to our window displays, in our direct-mail work and other promotional efforts. It strikes me that this idea of cooperation, of everybody working for the same end, has been carried much further in the electrical industry than our own, and that we might well apply the principal to appliances other than the gas refrigerator—to water heaters, house heaters, ranges, etc. I don't mean cooperate with the manufacturers alone, but with each other, as well. Why shouldn't gas companies in the same trading area campaign the same products in the same way at the same time, and make every dollar work twice as hard? Five little campaigns may be absolutely lost individually, but pool the five together, make one big campaign, and you've got something that is impressive."

Future House Meetings

An interesting paper, "What Is Ahead in the House Heating Field," by Samuel R. Lewis, was replete with suggestions for bettering gas house heating service. Looking ahead he made the following observations as to the status of house heating and, indeed, house cooling.

"I see ahead in the house heating field the universal

provision of scientifically insulated buildings. In these buildings there will be neither dust of coal and ashes nor noise and odor of oil. The heating will be automatic from one year's end to the other, and gas will be burned.

"A change of air within the house will be provided by designed and controlled methods, and this will be provided whether the gas shall be burned in a furnace or in a boiler.

"Electricity and gas will work hand in hand, one controlling and emphasizing and abetting the other.

"In the warmer climates houses will be cooled for comfort in Summer just as unobtrusively as they are heated in Winter."

"Concerning cooling for comfort in houses there is a great future for gas as a fuel. We have not even approached the ultimate in simplicity which will be attained.

"We have proved definitely that the human body will be comfortable and well if we reduce the moisture content of the air in Summer even though we may not reduce appreciably the dry bulb temperature of the air. This reduction in moisture content may be achieved in an ideal manner by a gas-burning house heating system which has mechanical ventilation with recirculation of the house air. It is not necessary that the entire house be provided with recirculation, nor that a warm air heating system be used. By adding to such a plant an automatic gas-regenerated Silica Gel air dryer with such cooling as may be obtained from a reasonable amount of city water we already can make a good sized house very comfortable during warm weather for the small sum of about $200.00 per year expended in interest, depreciation, gas, electricity, and water. The plant is automatic.

"When forced circulation hot water gas-burning heating is used it is practicable to operate the water circulation in the radiators which are used in the Winter, for Summer cooling, and while I know of no residence plants which have this arrangement there are two office buildings which have it. An absorption type gas refrigerating plant arranged to cool the water may be placed in the basement. The cool water is pumped to the radiators, which have local fans for recirculating the air. Such an arrangement has very interesting possibilities, especially as it affords an opportunity to use city water directly for cooling during a considerable part of the Summer, as in the Lake-supplied cities where the water remains cool through the early heat waves.

"I believe that the history of the gas burning heating plant of the future will follow the history of the solid fuel burning heating plant. The manufacturers of furnaces, following the history of the manufacturers of boilers, will abandon the contracting business.

"The contractors for warm air heating, like the contractors for steam and hot water heating, will cease being engineer-salesman, but will be salesmen of workmanship rather than salesmen of proprietary materials.

"Designs of the installations will be made by architects and engineers, and these designs will, as is the case at present with steam and hot water heating, practically be universally adaptable to any make of proprietary apparatus.

"The larger, more costly houses will use steam or hot water to carry the heat from the gas fire to the rooms.

"An indirect radiator or several of them, with fans will provide ventilation.

"The smaller, less costly houses will use warm air heating, recirculating the internal air but with a designed cold air intake, just as with the steam or hot water systems, for air-renewal and odor-abatement purposes.

"All three methods of transferring the heat from the gas to the rooms will be mechanically accelerated so that pipes and ducts may be very small and inconspicuous, with electric vacuum pumps on the steam systems; with electric circulating pumps on the water systems; with electric fans on the warm air systems.

"A production warm air heating unit of small size with few if any ducts will be developed. The experienced contractor may look at the plan or at the house and say, 'that house needs four units, or it needs six and one-half units—call it seven units to be safe,' and will straightway take these low-cost units from stock and will simply connect them up with gas, electricity and chimneys. When gas warm air heating develops such a unit it will begin to become profitable to some one besides the gas company!

"Here are some interesting figures of costs as of 1931 for a Chicago house.

"The warm air furnace plant is of the elaborately designed duct type.

"The hot water plant uses unit heater-coolers in the principal rooms, each having a built-in electric fan.

"The warm air furnace plant has an air washer with an electric spray pump for heat transfer from the refrigerated water.

"The hot water plant uses forced circulation cold water through the pipes and radiators.

"The warm air plant has only the unobtrusive registers in the rooms, while the hot water plant has enclosed cabinet radiators, which occupy valuable space."

	Mechanical Warm Air	Forced Hot and Cold Water
Investment Cost (Actual Bids)	$3,000.00	$4,000.00
Interest and depreciation, 4.3% on 15 year basis	129.00	172.00
Gas for heating 560 B.t.u. per cu. ft. at 75% efficiency at 85c per M cu. ft.	826.00	826.00
Electricity for main fan, 2,520 hours at 565 w. at 5c kw.	71.00	
Electricity for unit fans, 2,520 hours, 380 w. at 5c kw.		48.00
Electricity for pump, 120 w., 2,520 hours		15.00
Annual Cost of Heating	$1,026.00	$1,061.00
Investment Cost for Cooling—		
Washer and refrigerating plant	$3,400.00	
Water cooling plant		$2,225.00
Interest and depreciation, 4.3% on 15 year basis	$ 146.00	$ 95.50
Electricity for compressor, 4.56 w., 600 hrs., 1.2 kw. at 5c kw.	164.00	164.00
Electricity for pumping water	9.00	6.00
Water for condenser	29.70	29.70
Operate the ventilating fan	18.00	
Operate the unit cooler fans		12.00
Annual Cost of Cooling	$ 366.70	$ 307.20
Cost per season for year-round comfort	$1,392.70	$1,368.20

Team Work

No better person could have been selected to talk of dealer cooperation than Mr. Hugh Cuthrell, who has had a most extensive experience with the subject. His paper, "Dealer Cooperation Today," referred to his

participation in recent conventions of retail hardware men and master plumbers by way of presenting the gas industry's attitude in the matter.

Discussing his own company's experience with dealer cooperation he said in part:

"We have reason to feel proud of the results of our Dealer Cooperation plan which was adopted in Brooklyn twenty months ago. During that period the sale of appliances, through dealers, grossed approximately $800,000. It might be argued by those indifferent to the cooperative plan that the business originating with the dealer would come to the utility through other channels and that in paying the dealer for his assistance we are merely opening up one more avenue to the sales field without in any way broadening that field. But our figures show conclusively that the dealers' contribution to our total business is something over and above what would have otherwise been secured, and represents a distinct gain through a widening of the field of our operations.

"Comparing company net sales, eliminating dealer purchases, for the year 1930 and 1929 there was an increase in sales of 5%. A similar comparison for the year 1931 against the year 1930 shows an increase in sales of 33%."

"The success we have achieved in Brooklyn under this plan we attribute to the equity of the plan itself and to the intelligent and whole-hearted support given it by the rank and file of our sales organization."

"In Brooklyn, we have re-enforced our plan by aiding the dealer in his merchandising work, by consigning appliances for display in his show windows and on his sales floor, by assisting him with advertising material, by conducting sales training classes for him and by broadcasting to the public through the medium of a wide-spread advertising campaign the message that a dealer who displays the "Great American Servant" symbol sells only approved gas appliances.

"In Brooklyn, we do not limit participation in our plan to a selected number of dealers but the plan is open on equal terms to all dealers. This provision, in my judgment, is essential to the success of the plan. Taking the subject of Dealer-Cooperation in the abstract and reviewing it as I have done as a practical proposition it appears that there is nothing more natural than that the dealers and the utilities should work together for their mutual advantage.

"We must, however, realize that even after the establishment of this cooperative movement that there are certain promotional essentials connected with merchandising that the utility must carry on. It shall always be the obligation of the utility, by advertising and otherwise, to create the market for gas consuming appliances; and to the dealer, there should be extended the privilege of participating in the business resulting from the market so created.

"In Brooklyn we have found that the dealer's interest in our business does not stop with his commission check. He goes much further and we find ourselves strongly fortified in our public relations through the missionary work of a satisfied advocate in every neighborhood.

"Further, we are all more or less familiar with the rising tide of hostile legislation which aims, in one form or other, at curtailing the promotional activities of the utilities. This type of legislation has found favor in some situations because of the belief that it would give to the dealers the advantages that it sought to deny to the utilities. It seems quite unnecessary for me to point out to this gathering the fallacy of such reasoning. But it is not sufficient for us to appreciate the vice of this type of legislation whenever and wherever it is proposed. We must impress on the dealers the thought that if the utilities are denied the right to promote their business by merchandising, the dealer will suffer along with the utility, and last but not least, the public will be denied those conveniences which, working in harmony with the tradesman, the utilities can and should provide."

Publicity and Advertising Section

IN VIEW of the present business situation the papers and addresses presented at this section, which was presided over by Mr. Donald M. Mackie, were quite timely and the effect of the depression on advertising and the suggested path to follow were treated of in a very constructive way in one or two instances. The tie-in of advertising with dealer cooperation also came in for very constructive advice. All in all the meetings emphasized the rock bottom necessity for good advertising, and the proper volume of the same, in the general scheme of marketing appliances and good gas service.

W. H. Hodge, Chairman-elect, Publicity & Advertising Section

The Advertising Behind The Advertising

This paper, presented by Mr. Henry Obermeyer, contended that while many people dealing with advertising compile fine forms giving data as to the time, scope, etc., seldom do these forms "state the real, the fundamental requirement—Why?" This is perhaps one of the reasons, he said, "why it is sometimes difficult to make

advertising in the public utility business assume the importance that most of us feel it should have—at least, in the minds of our superiors."

Regarding the cuts in utility advertising appropriations Mr. Obermeyer stated that, "these have occurred in many cases in those companies which could least afford it, either because they are already losing enough as it is, or because their expenditures for advertising, being proportionately well below those of other industries, including their competitors, are also below the line of minimum efficiency—meaning that advertising dollars are being wasted for sheer lack of attention."

This state of affairs, he indicated, is somewhat serious and the "future welfare and progress of our companies is at stake."

Mr. Obermeyer declared that he cannot see "any justification for charging the bulk of advertising expenditures to merchandising, as many companies do." "If you are really going to charge any substantial amount of advertising against merchandising of appliances," he said, "therefore why should it not be limited only to that portion of the budget which represents the additional investment required for merchandising, as compared with what would be expended in any event, even if no appliances were offered for sale? By making advertising exclusively, or even mainly, a merchandise account, you simply make yourselves vulnerable to any changes in merchandise policy—changes which usually do not affect in the slightest the essential purposes for which the gas company remains in business, and which *should* not, therefore, affect the necessity for advertising."

Referring to his own company's practice in advertising househeating he said:

"Like most other gas companies, the Consolidated Gas Company has been advertising househeating for a number of years. We had always been told—and believed—that househeating should be sold on the basis of cleanliness, comfort, and convenience, with at least a word or two about service and health. The cost should never be mentioned except with bated breath, and then only in connection with certain off-setting economies.

"This sounded like good psychology, and, as a matter of fact, it helped to sell an increasing number of househeating jobs. In the meantime, however, special new gas rates were established which, under certain conditions, reduced the cost of heating with gas by about half. The direct result was that the average radiation requirements per househeating customer began to drop—meaning that many of the new customers were living in smaller, and presumably more modest, dwellings than the average in former days. Almost at once, we found ourselves selling househeating installations in hundreds of new homes in real estate developments where the purchase price of a house varied from $9,000 down to $8,000 and under.

"Now, comfort and convenience were still as attractive as ever. But there was also a lot of explaining to do. Few prospects for these houses knew what the new rates were intended to accomplish. Rumor had done its work, and the general impression prevailed that gas, for heating purposes, was much too expensive for any but the very rich. It was obvious that an entirely new plan of advertising was needed to correct this situation, to help our builder friends sell their gas-equipped homes, and to remove a firmly entrenched barrier against future househeating sales.

"As a matter of fact—and I think this is true in most communities—the public is already thoroughly sold on the merits of househeating by gas. When people install oil burners or automatic stoking devices, they do so in most cases under the impression that gas is out of their economic reach—but they want, nevertheless, some of its more striking benefits, with the result that they accept what seems to them a satisfactory compromise.

"Here we have a plain case of advertising that is shaped and fashioned by the requirements of the market by the gas company's immediate selling problem. I am not prepared to say that this is the only way in which advertising ought to be planned, but I will say, from my own observation, that, especially at this time, there could be much more of it, and proportionately less of the synthetic variety sometimes described as "selling the benefits of the service." Experience has shown that you can keep on doing the latter—which has its own value, of course—long after the necessity for it has ceased, and sometimes only by sacrificing the opportunity for more effective and strategic methods of attack.

"Because of the constant emphasis on public relations," continued Mr. Obermeyer, "service, and good will, there is an ever-present danger that even the promotional advertising of public utilities may become divorced somewhat from the day-to-day necessities of the organization on the firing line. The advertising manager, if he values his appropriation, will jealously guard against anything like this. He will do it by establishing between his department and all the divisions, groups and individual selling forces of the company a channel of cooperation and inter-communication that will make his advertising instantly responsive to the needs of any occasion. He will be in a position to suggest the remedy even before the complaint is acute enough to demand his attention."

In conclusion Mr. Obermeyer stated the following:

"Utility executives are human. When economy is the order of the day, it becomes difficult to take recommendations for any extra expenditures on faith alone. Advertising today must stand on its own feet, and this is a good thing both for advertising and for advertising men. 'WHY' is a fair question, fairly to be answered without digging down into a bagful of intangibles.

"As executives are human, they also, I suppose, have a right to be humanly inconsistent—to question the value of advertising for their own companies and then grow warmly indignant under the published attacks of demagogues or competitors. There is not a gas or electric company manager, up to his job, who does not scan the local newspapers daily for the slightest derogatory implication, and demand of his advertising and publicity departments that the public be given the 'facts.' This is his unconscious, if sometimes exaggerated, tribute to the power of advertising, especially when issued by others. Why can't we, as advertising men, be allowed to expect that our companies place as much value on the potentional influence of our own announcements as on those of competitive interests and industries? I believe that we can."

Advertising and Dealer Cooperation

"Advertising and Merchandising Aspects of Dealer Cooperation," was read by Mr. J. C. Barnes and narrated the experience of New Orleans Public Service Inc. Mr. Barnes told how, over a period of eighteen months, the proper cooperation with other appliance selling agencies in their city plus the proper advertising

had been instrumental in marketing a very large number of appliances.

Relative to mechanical refrigeration he went on to state that his company had made an agreement with refrigerator dealers and the local ice companies to the end that the utility company refrained from stocking any refrigerators, but did sell all makes of refrigerators, both electric and gas, as well as an ice box.

The utility company agreed to purchase the refrigerators from the dealers at the proper discount, to finance the sales and to pay the dealer his money upon consummation of the sale. Further, Mr. Barnes' company agreed to finance all advertising at no cost to any dealer. The advertising copy was prepared and in April 1930 a refrigerator show was staged. In this show each dealer was allowed to have a display and sales booth, the show being held in the utility's building. Window display received considerable attention during the show and more than 40,000 lines of display advertising were used in four daily New Orleans papers. During the six days of the show approximately 50,000 people attended. As to sales, 261 electric and gas refrigerators were sold, the largest number ever marketed in a single month in this city up to this time.

In May of the present year the second show was held, with an attendance of 40,000 people, and the third was held during the past September with an attendance of 25,000 people.

Sales Have Increased

"All those participating," said Mr. Barnes, "are satisfied. Sales have increased. Advertising has increased. Dealers have made more money and we have sold more electricity and gas. During the year 1930 our company and the dealers of New Orleans sold 2,619 electric and gas refrigerators. During the first nine months of this year 3,345 electric and gas refrigerators were sold, 726 more than were sold during the entire year 1930. We feel that we can safely attribute this increase, and the friendly feeling that now exists to the co-operative sales and advertising plan adopted in March 1930."

A somewhat similar arrangement was made with the water heater dealers and plumbers of New Orleans. "We were to sell the heaters of the dealers, agreeing not to stock heaters ourselves. All heaters sold by the company would be installed by the plumbers. Each dealer in turn was given a month's display in our windows and on our sales floor. During that month his heater was to be featured, and all advertising costs were to be borne by the company.

"During the first fifteen months 5,299 water heaters were sold. Comparative figures are not available at this time, but it is by far the greatest number of heaters ever sold in New Orleans in the same space of time."

"New Orleans' First Annual Water Heater Show featuring the latest developments in automatic water heaters and their use as an aid to health and cleanliness was held on our sales floor the week of July 13-18. Despite three days of unusually inclement weather more than 25,000 people attended the show. The show was sponsored by the New Orleans Hot Water Service Association which is made up of the water heater dealers, licensed master plumbers and New Orleans Public Service Inc. The entire cost of this show, including advertising, was paid for by our company.

"As far as we know this was the first water heater show ever held in the United States by a utility company. It was realized that special attractions other than the mere display of water heaters would be necessary in order to attract the crowd. After considerable investigation it was decided to create a replica of the famous "Old Faithful" geyser of Yellowstone Park, on the display floor as a special feature of the show. This attraction lent itself to a show type of advertising copy, and at the same time dramatized hot water. Other features were a giant water heater erected on the marquee of the building, towering more than thirty feet high, and also a very elaborate show window display depicting the evolution of water heating through the ages. Beautiful fountains in a setting of tropical shrubbery added further attraction to the show, and unusual care was given to ornamental lighting effects which made the entire display floor a very colorful and attractive scene.

Volume Advertising

"Each of the seven water heater dealers was given a special booth on a raised platform which made possible water and gas connections for the actual demonstrations of the heaters. Our two large interchangeable letter electric signs were used during the week before and the week of the show. Special car cards were placed in the front and rear of all street cars and a special street railway bulletin with a circulation of approximately 100,000 per week was dedicated entirely to the promotion of the show. 15,000 pamphlets distributed to housewives by the bill deliverers of the company were also used. There were more than 20,000 lines of newspaper copy used. In addition some 4,000 direct mail invitations were sent to architects, prominent landlords, and other outstanding people of the city.

"The show was staged under the general supervision of the Commercial Department, and the creation of the geyser and fountain, as well as the window displays and decorative effects were achieved by our own people.

"This show was staged as the opening gun of a two months' intensive water heater sales campaign. This campaign began on the first of July and lasted through August. The set-up of this campaign was the co-operative sale of water heaters by the dealers and the employees of New Orleans Public Service Inc. The sales quota of the employees of our company was set at 375. 520% of this quota was sold. Each department of the company became a competing team and the individual sale of each of three departments exceeded the total quota set. In all 1,949 water heaters were sold by the employees of the company during this two months' campaign. The dealers sold 427 heaters, making a total of 2,375 heaters sold in the City of New Orleans during July and August. More heaters were sold during these two months than had ever been sold in New Orleans in a single year.

"The installation of these heaters was made by the members of the Master Plumbers Association. The purchaser of a heater had the privilege of selecting his own plumber to make the connections, or to deal directly, or through the company, with the plumbers' association. In cases where the buyer had no preference the selection of the plumber to make the installation rested with the licensed Master Plumbers Association. The plumber making the installation of a heater sold by our company received in addition to the cost of installation a liberal commission on the sale, even though the sale did not originate with the plumber making the connection."

It is interesting to note that Mr. Barnes' paper brought out that quite similar plans are on foot between the hardware and furniture dealers of New Orleans and his company.

Accounting Section

MORE and more all gas men, particularly those concerned with the technical side of the business, are coming to appreciate the value of knowing more than a smattering of proper accounting practice. This is attested to by the relatively large number of such men in attendance at the meetings of the Accounting Section. Accordingly, they did not come away from these meetings empty handed because the papers were of a high grade. Office equipment necessary to good accounting practice and other live topics received due consideration under the Chairmanship of Mr. J. I. Blanchfield. Incidentally, the report presented by Mr. F. G. Atkinson on the general subject of clerical employees was particularly fine.

Wm. A. Doering, Chairman-elect Accounting Section

Merchandise Accounting Developments

Although this paper, by Mr. H. C. Davidson, was presented before the Commercial Section, we have felt that its present location in our Convention Report is not entirely out of place. It is largely reproduced herewith.

"Probably the first question which may logically be asked regarding the classification is as to its purpose and usefulness. It should be recognized at the start that a merchandise classification under any circumstances, is nothing more than a piece of accounting machinery. Its importance should not be exaggerated beyond that point.

"Properly designed accounting machinery, however, is the first essential to accurate results. And, accurate yardsticks are as necessary to the assurance of sound merchandising practices, as they are to the attainment of operating economies in the production or distribution of gas.

"Speaking more specifically, the avowed purpose of the classification may be stated as a statistical record, designed primarily for purposes of management, to measure the results of appliance sales, as distinct from other new business operations. It is not offered as a unit of the corporate accounts, unless a company may desire to use it in that manner. Instead, it is as an independent study of operating efficiency, which may be entirely apart from the books of account, that the classification can probably be of the greatest general value.

"For this use it offers opportunity for many informative comparisons and operating ratios of appliance sales, which, if carried through can only lead to economies of operation and improved efficiency. Its adaptability to the conditions existing in most companies was demonstrated by the test to which it was subjected in the 1930 reports submitted to Association Headquarters.

"Although the classification is thus submitted as an internal departmental record, and as an instrument of research for the study of the returns and costs to the gas business resulting from the sale of appliances, we should not forget that it may also have a public aspect. The attention which has been focused upon utility merchandising from outside sources has given such significance to any accounting conclusions upon the subject emanating from within the industry, that it behooves the commercial and accounting officers of the companies to use the utmost care and thoroughness in applying the classification to their local conditions. The results thus attained may conceivably become one of the contributing evidences upon which the public may judge the merchandising practices of the utilities.

"The recommendations of the Committee have not escaped criticism or doubts as to the wisdom of attempting to segregate merchandising results from other new business operations.

"In the words of one critic (who, by the way, is a personal friend) the Committee has been guilty, first, of taking the position that appliance sales are purely a load building operation next to impossible to segregate from gas promotion, and then, of reversing itself by submitting a classification to provide for the impossible.

"Another dissenter, also of high standing in his profession, takes the position that any attempt to pick out the elements of cost applicable to appliance sales as such is futile, and can only result in an artificial set-up between merchandising and other new business activities which may invite criticism. From still another source comes the objection that too much emphasis has been laid upon appliance sales as a merchandising operation.

"These and many other divergent viewpoints found expression in the deliberations of the Committee, from which there gradually evolved the consensus of opinion as to the fundamentals of the question that is reflected in its final report. There is admittedly some justification for these objections. But to me they seem trivial in comparison to the obvious need at the present time of the best enlightenment the industry can get on this subject, which can only be attained by an aggressive seeking out of the facts.

"One of the high spots in the activities of the Committee has been the work of Sub-Committee on Load Building Statistics, under the able leadership of Mr. Davis M. DeBard, to stimulate and develop statistics of load building, as one of the yardsticks for measuring the returns from appliance sales. During the year, the Sub-Committee, in conjunction with Association Headquarters, has initiated the reporting and interchange of statistics of gas consumption of various appliances, as a

first step toward the ultimate compilation of approximate totals for the industry of the added annual gas load contributed by appliance sales.

"I have always been of the opinion that load building, if it could be measured accurately, would give a more correct picture of the return from appliance sales to the gas business than any income statement of merchandising operations, for its value to the gas business is continuous and cumulative. That is probably an ideal which can never be fully realized, and yet I am satisfied that with sufficient time and effort, load building estimates can be developed which will be worthy of equal consideration with the merchandise income statement, as accepted yardsticks of the success of appliance operations.

"The Sub-Committee has done an outstanding job in the progress they have made in this difficult task during the past two years, and are entitled to your active support. I sincerely hope that the Commercial Section will pursue this effort until sufficient experience has been gained to insure results that may be accepted as reliable and representative of the industry.

"Probably the strongest impression which I carry from the three years' contact with the subject, is the unmistakable trend of opinion within the industry during that time toward the recognition generally of the inseparable relationship of appliance sales to the gas business, and to the predominating influence of promotional objectives upon merchandising practices.

"When the Committee commenced its activities, it found a considerable number of companies who professed to be selling appliances as a merchandising enterprise, comparable with the business of the department store or local dealer. But since that time there has been a very evident trend toward the acceptance of the stimulation of gas sales as the controlling influence upon appliance sales, and toward the adoption of merchandising practices consistent with that principle. At the present time the relation of appliance sales as an incidental part of gas promotion, I believe, has become generally acknowledged.

"But we should be careful that in rallying to the cause of gas promotion as the real objective, we do not overlook the fact that involved in that activity is the actual sale of merchandise, which should conform to sound merchandising practices generally. The acceptance of the promotional principle does not constitute adequate reason for failure to recognize the fundamentals of merchandising, to the extent to which they may exist in the new business operations. Not does it relieve the companies of the responsibility of proving affirmatively the soundness of their merchandising practices. Not even the inherent difficulties of "unscrambling" the costs of appliance sales from other promotional expenses, is a valid excuse for failure to ascertain, as far as the information is determinable, the respective results of each.

"We all realize, I believe, that there is a point in the promotional operations of the average company where the creating of a market or the pioneering ends and the actual sale of a commodity begins. It may be at a different point for different classes of appliances, and we may not all be in agreement as to the exact location of that point. None of us seriously contend, however, that our appliance sales are entirely free of merchandising influences, even though the promotional requirements of the activity by their very nature must predominate.

"In spite of the attention and study already given this subject, the real problem before the companies at this time, as I see it, still is the complete analysis upon a comprehensive scale of new business operations, in a form adapted to comparative study, to ascertain more precisely and more scientifically what elements of cost are really promotional and what expenses are actually incurred as the result of selling appliances. Speaking from the broad viewpoint of the industry, we have only made a good start toward that goal.

"As has been so ably pointed out by Colonel Fogg, such an allocation of costs is essential if the principles for promoting cooperative trade relations adopted by the Association are to be properly applied. Only with the full knowledge of the true costs of promotion and merchandising respectively, can the soundness of the practices in effect as to each be determined positively.

"So if there is any one message I may be privileged to bring to you today, as the final word of the Committee, it is to urge that the commercial and accounting officers of the companies carry further their studies of this question, and interchange their findings with others, until conclusions may be reached as to the allocation of these costs, worthy of acceptance both by the industry and the public as authentic information on the subject. Toward that end I earnestly ask that you support the Association Statistical Department by full cooperation as to the data you can furnish, and that you avail yourselves of its assistance as to the experience and comparative results of others.

"The future of merchandise accounting is in your hands, and its value as a guide to management will depend in large part upon your initiative and ability to set forth accurately the operations of your own companies."

A Program in Employee Relations for the Office

This paper, presented by Mr. F. G. Atkinson, Chairman, Office Management Group, contains a wealth of fine information relative to the selection, compensation, training, well-being, etc., of the office employee. Some portions of this report follow.

"Rating scales are still controversial matter but they are in general use and it seems fairly well agreed that they are a step in the direction of more accurate appraisal of employee worth on a given job, as well as of an individual's likely future progress. Production records are of course, superior measures of individual output, and in general rating scales should not be applied to abilities which can be objectively measured. These are, however, qualities which make for success or failure on the job, which cannot be put down in terms of units accomplished with a given number of errors.

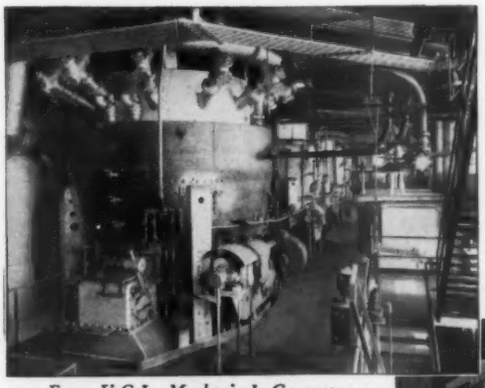
"Among these qualities which may best be appraised on a rating scale are leadership, judgment in analyzing problems and organizing work, willingness to cooperate, fairness in dealings with men and with issues, personal acceptability to associates and subordinates, tact, and many others.[1]

The following points are suggested as a guide in the development and use of a rating sheet.[2]

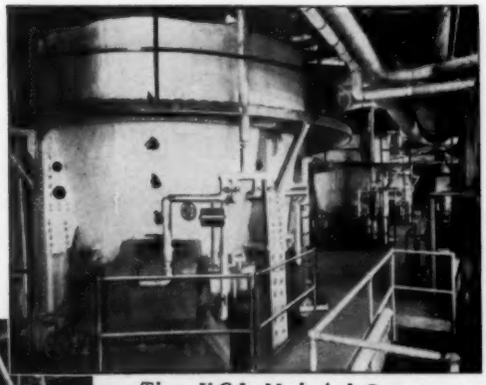
[1]Report of Committee on Office Personnel, Accounting Section 1930, pages 14-19.

[2]From a report prepared by the library of Henry L. Doherty and Company.

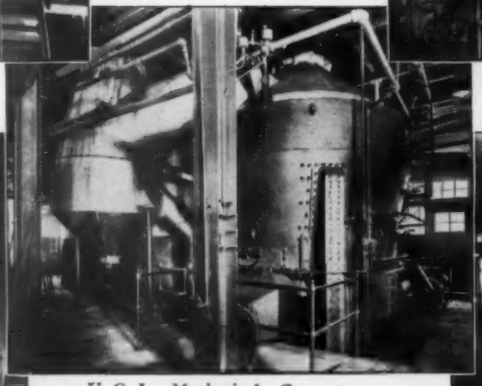
(Continued on page 59)



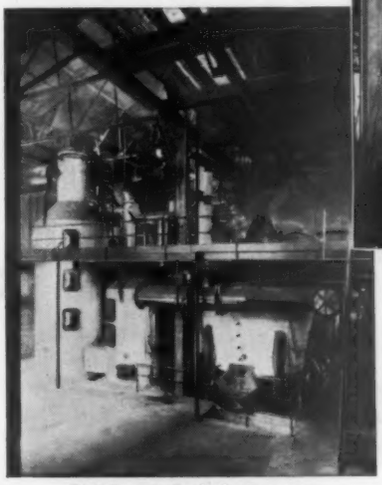
Four U.G.I. Mechanical Generators at Chester, Pa.



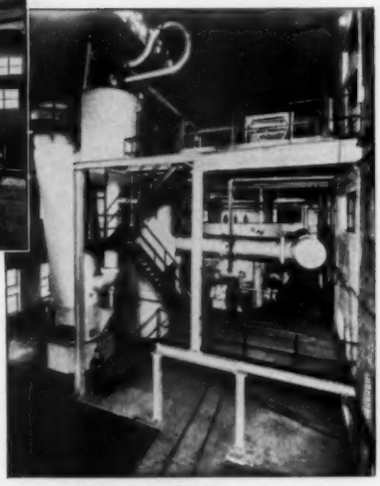
Three U.G.I. Mechanical Generators at Philadelphia, Pa.



U. G. I. Mechanical Generator at Camden, N. J.



U.G.I. Mechanical Generator at New Bedford, Mass.



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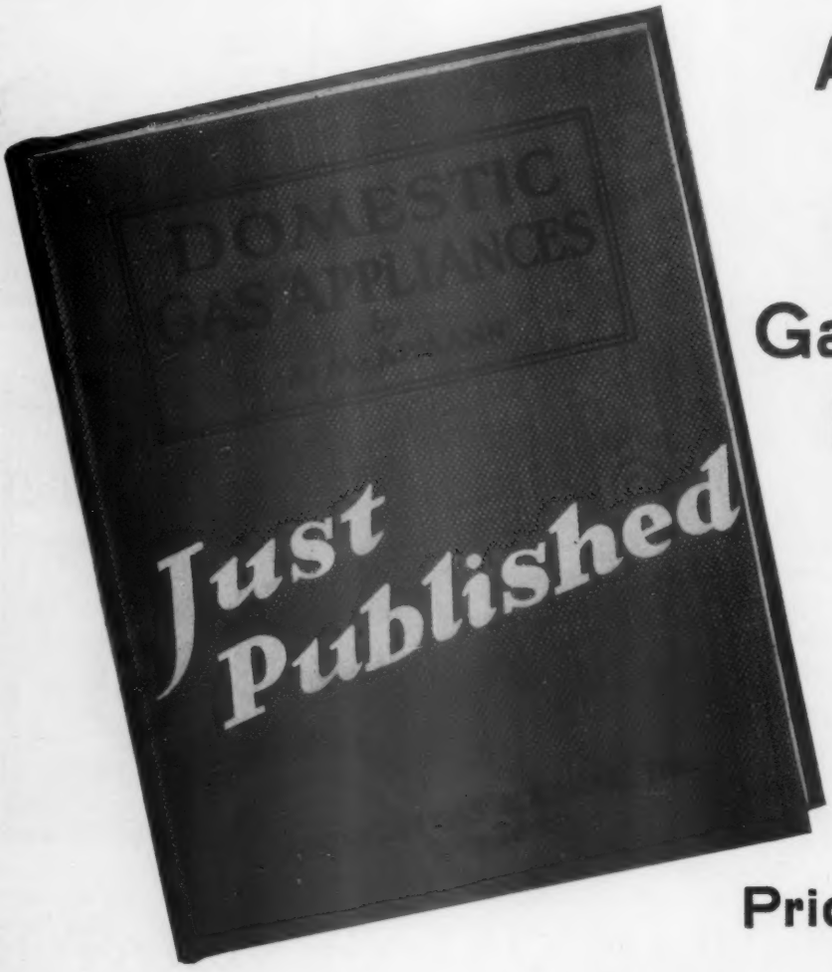
MAXIMUM RETURN TO CLIENTS PER DOLLAR INVESTED



A Book for Every Gas Man's Library

BOUND IN SEAL GRAIN STURDITE FABRIC

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This book presents first-hand facts and data, profusely illustrated, concerning every type of domestic appliance which uses gas as a fuel, and is of special interest to gas men interested in the sale of such appliances. Mr. Apmann has made an intensive study of gas utilization and therefore writes authoritatively on this subject.

Listed below are the chapter titles of the book which are indicative of its comprehensive scope. A list of pertinent questions on each chapter will be included, which adds to its value as a real text book on **Selling gas appliances.**

I. Competitive Fuels
II. Manufactured and Natural Gas
III. Comparative Fuel Costs
IV. Capacity of Pipes, Meters and Gas Orifices
V. Appliance Installation
VI. The Gas Range
VII. Gas Range Accessories
VIII. The Gas Water Heater
IX. Water Heater Accessories
X. Gas for Househeating
XI. The Househeating Furnace and Accessories
XII. Calculating Househeating Requirements
XIII. Miscellaneous Househeating Considerations
XIV. Space Heaters
XV. The Health Givers of the Cellar, Incinerator and Laundry Equipment
XVI. Gas Refrigeration
XVII. The Future of Gas Utilization

AMERICAN GAS JOURNAL

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For drilling gas mains under pressure

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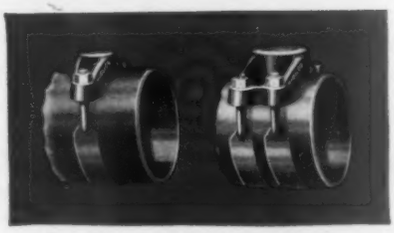
For swift, serviceable drilling jobs where cuts must be made in the field, specify the MUELLER Model D Drilling Machine. It quickly makes cuts from 1 to 2 inches into gas mains without waste motion or interfering with flow through the main.

A standard MUELLER double strap service clamp around the pipe, the correct stop in place, and a few pulls of the ratchet-equipped handle complete the job.

It pays to standardize on related equipment built by a single manufacturer. MUELLER Drilling Machines, corporation stops and service clamps are built to operate as a unit. 74 years of experience in building fine tools and equipment for the gas industry are your guarantee of faithful service.

MUELLER CO. (Established 1857), *Factory:* Decatur, Illinois.

***Branches:* New York, Dallas, San Francisco, Chicago.**
***Canadian Factory:* MUELLER, Limited, Sarnia.**



MUELLER Single Strap Service Clamp G10450. Made of malleable galvanized iron. For use under all ordinary conditions for gas and water service.

MUELLER Double Strap Service Clamp G10494. Made of malleable galvanized iron. Especially recommended where high pressure, heavy duty or severe weather conditions are encountered.

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UNITED ENGINEERS & CONSTRUCTORS
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MAXIMUM RETURN TO CLIENTS PER DOLLAR INVESTED

Employee Relations

(*Continued from page 54*)

1. Choose qualities which are *directly* related to the kind of work which the employee actually performs.
2. Limit the qualities to a small number.
3. Endeavor to express the qualities selected in terms of how the employee actually handles a particular situation.
4. Avoid atempting to secure accurate judgments with regard to characteristics which the supervisor cannot really know.
5. Separate clearly estimates of the employee's past performance from the advice which may be requested with regard to future progress.

"The following suggestions are intended to govern rating procedure:

1. The idea should be sold to supervisors.
2. Administrative pressure should be put behind the rating system.
3. Rating sheets returned should be scrutinized in order to see whether they are consistent.
4. An employee should be rated by several persons whenever possible.

"Many executives believe that greater value is derived from rating scales when the employee is permitted to see his own report, and has an opportunity at the same time to discuss with his superior the judgments recorded, and the progress he has made.

Home Service Meeting

WE BELIEVE this meeting of home service was the best held to date and Miss Kearn Fladoes, Chairman, did a real job in providing the caliber of speakers who were present and in the general handling of the meeting. Hula Ungerich, Grace Pennock, Dorothy Shank, E. R. Acker, G. W. Ousler and others delivered addresses. From these we have selected for somewhat full presentation the paper by Mr. Acker.

Left to Right—Hulda Ungericht, Columbus Gas & Fuel Co., Columbus, Ohio; Jessie McQueen, American Gas Association, New York City; Jessie Reade, Consumers Gas Co., Toronto, Canada; Karen Fladoes, Equitable Gas Co., Pittsburgh, Pa.; Martha Lou Grant, Brooklyn Union Gas Co., Brooklyn, N. Y.; Ruth Soule, Brooklyn Union Gas Co., Brooklyn, N. Y.

Impressions of Home Service

"I think in the early days of Home Service there were many misconceptions as to its purpose and as to its justification. We had the sentimentalist; we had the altruist; we had those that believed it was a great God-given service to womankind, and I think that some of the early troubles in getting Home Service generally accepted by the industry was due to the over-zeal of some of those schools of thought.

"You can't fool the customer. I am convinced that if you tell the customer what you are trying to do, tell them fairly and bluntly, they will accept Home Service and will like it. As far as the industry is concerned, it seems unfortunate that anybody in the industry should have to be sold on it. I think that any executive of the industry who followed any one of you from day to day in your contacts with our customers, couldn't help but be impressed with not only the justification of the work but the tremendous possibilities of it, the future possibilities.

"To come back to the customer—I don't think you can justify Home Service to the customer on anything but a commercial basis. You cannot take one part of a company's activities and give it a different motive than the organization or company as a whole stands for, and without any question our industry, any industry, has just one motive primarily, the profit motive.

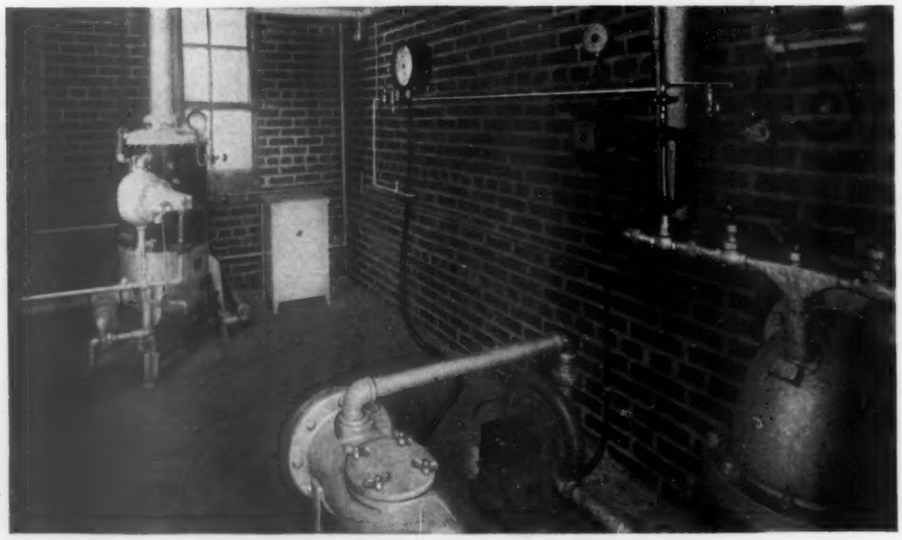
"Now, the question is how to relate a Home Service activity to that primary motive of our business. I think you have a tremendous opportunity. I think that the Home Service work will be expanded as a matter of fact in the future. The industry is faced today with much investigation and with a great deal of criticism—unfairly, we think, and yet I think that one of the reasons we have the situation before us that we are in

(*Continued on page 61*)

Obviating Changeover Troubles

W. C. BEGEEBING

Asst. Chief Engineer, C. J. Tagliabue Mfg. Company



Installation of Automatic Saturation Equipment

A MANUFACTURED gas property about to change over to natural gas must consider many problems—consumer education, appliance adjustment, complaint handling, planning the actual changover, leakage and dust troubles. These last two, leakage and dust accumulation, obviously, can be handled simply and inexpensively by equipment which has been especially designed for the work and which has demonstrated its effectiveness and dependability over long periods and in many different localities.

It is hardly necessary to explain that the difficulties caused by leakage and dust result from the introduction of a bone-dry "moisture-hungry" natural gas into a system which previously had distributed a moisture-laden manufactured gas which also contained oils, naphthalene, tars and other condensates. The manufactured gas kept the joints liquid-saturated and tight. The bell and spigot joints in cast-iron mains and other joints packed with lead cement and yarn especially required moisture to maintain their tightness.

Potential leaks in cast-iron mains in the form of minute openings and crevices are filled up and in general the interior of the mains and service pipes (partly by deposition and partly by corrosion) become covered with this deposit.

Leakage and Dust Troubles

Consider the effect of the "moisture-hungry" dry natural gas. In a very short space of time every trace of moisture will be removed and the system will be completely dried out. This complete dehydration will result in the following troubles:

1 Joint packings in the mains and services will be dried out, causing a startling increase in the gas unaccounted for. In one actual case this figure went from 250,000 cubic feet per mile of 3 inch main per year to nearly 2,000,000 cubic feet in less than a year.

2 The deposit on the interior of the mains will be dried out and loosened, and this rust and scale will be carried along to clog appliance orifices, house regulators, etc.

3 Drying out of meter washers and union washers will cause leakage on the consumers' premises and result in more service calls. Abnormal shrinkage of meter diaphragms will also increase complaints and maintenance.

4 The drying out and removal of the pasty deposits whereby the minute holes in cast iron pipe remain closed, will open these holes and thereby add to the leakage and aggravate the dust troubles.

Saturation—The Preventative

This truly formidable list of troubles is invited if the changeover is made without immediately saturating the natural gas to bring it as nearly as possible to the moisture content of the manufactured gas. Properties which did not employ saturation have been obliged to wage a constant fight against leakage and dust. After four and five years of warfare these two enemies are still in the field.

On the other hand, where automatically-controlled steam saturation was instituted at once, leakage and dust caused no trouble. The duplication of the main interior condition by properly steaming the natural gas produced the moist condition whereby tightness was maintained and corrosion and other deposits were kept dormant.

The success of saturation depends largely on the proper selection and installation of the equipment, particularly of the automatic controller which is responsible for the whole operation.

Saturation Must Be Automatic

Efforts to saturate without automatic control have met with poor success. We quote from a paper by one of the outstanding pioneers on this subject, Mr. E. C. Kollock of the Southern Cities Public Service Co., Atlanta, Ga. Mr. Kollock's experience gives his statement unquestionable authority. At the Mid-West Gas

Association 1931 Convention, he said: "One of the principal lessons that we have learned in attempting to properly condition natural gas with odor, steam and oil fog, is the absolute necessity for automatic controls for all of them, if satisfactory results are to be obtained. I cannot emphasize this too strongly. The demand for natural gas varies widely from hour to hour and from day to day, and, unless automatic controls are used, the required amounts cannot be maintained."

The injection of steam at a constant rate, after calculating the required quantity based on average gas rate from a station, will not secure the complete and uniform saturation at all times. The presence of condensed water in the drips is no guarantee of saturation. At peak loads the gas might have as low a humidity as 40% while at night loads the gas will be super-saturated. The condensation during the night hours during low load conditions fills the drips and therefore the drip pumpage is no accurate guide to proper saturation hour after hour.

Moreover, with dependable automatic control, over-saturation is prevented as well as under-saturation, thereby keeping drip pumping within reasonable limits.

Saturate at Distribution Pressure

Good saturation requires that sufficient steam be admitted to maintain the relative humidity at 85 to 95% throughout the system. The steam must be introduced at the outlet of each district regulator so that the saturation is accomplished at the distribution pressure of the gas. For example if the gas were saturated at ten pounds pressure at the city gate and was then reduced at the district regulators to 6-inch water pressure it would go into the system only 60% saturated.

For good saturation there must be a saturation control set-up at each district regulator station.

Soil and Corrosion

CORROSION experienced in the operation of a group of pipe lines in Ohio was found to be related to the kinds of soil which occur along a 32-mile section of the lines. Soils of the Brookston series in this area are noncorrosive. Soils of the Nappanee series proved to be corrosive wherever they occurred. The Wauseon soils occurring on slopes or slight ridges were observed to be corrosive. Other sandy and sandy-loam soils not underlain by glacial material apparently have little corrosive action. A satisfactory correlation was found to obtain between the exchangeable hydrogen present in the soils and corrosiveness as indicated by the quantity of pipe replaced in 1,000-foot intervals. The hydrogen ion concentration of soil samples in normal potassium chloride solution is a fairly satisfactory index to the corrosiveness of the soils studied except in the case of slightly buffered sands. Both methods, however, tend to exaggerate the corrosiveness of well-drained sandy soils. An accelerated laboratory test of soil corrosiveness involving the corrosion of a steel disk in contact with moist soil is described. The results obtained paralleled the quantity of pipe replacements fairly closely in the case of heavy soils. The degree of corrosiveness indicated by the test is influenced by the acidity, texture, and probably by the structure of the soils studied. Since only a qualitative study of the factors influencing the test has been made, the test can not at this time be considered a reliable index of soil corrosiveness except in the case of soils similar to those tested. The methods described for identifying corrosive soils which involve determinations of acidity are probably most reliable in the case of related soils which differ from one another chiefly in their contents of exchangeable hydrogen. The data obtained from the tests are probably insufficient to indicate the relative corrosiveness of soils having widely different physical and chemical characteristics.—*I. A. Dennison, Bureau of Standards Research Paper 363.*

Impressions of Home Service

(Continued from page 59)

today is because the utilities have not generally fully developed their business. You can't serve two masters, and I feel personally that many of the leaders of our industry have thought more about cashing in on the equities in their properties than about fully developing their business.

"When we talk about fully developing our business, Home Service comes in strong. I think that the Home Service girl of the future must be not a dietitian or a home economist—I don't like that word economics anyhow; it always makes people think of something highly theoretical, whereas it is nothing but just plain, ordinary, garden variety business—the Home Service girl of the future must be a business woman, I think. I think her job is going to be to teach the customer how to make the full use of our gas service profitable to herself, and that is a big order. It is a large job, and it holds before you tremendous opportunities, much greater, I think, than you have had in the past.

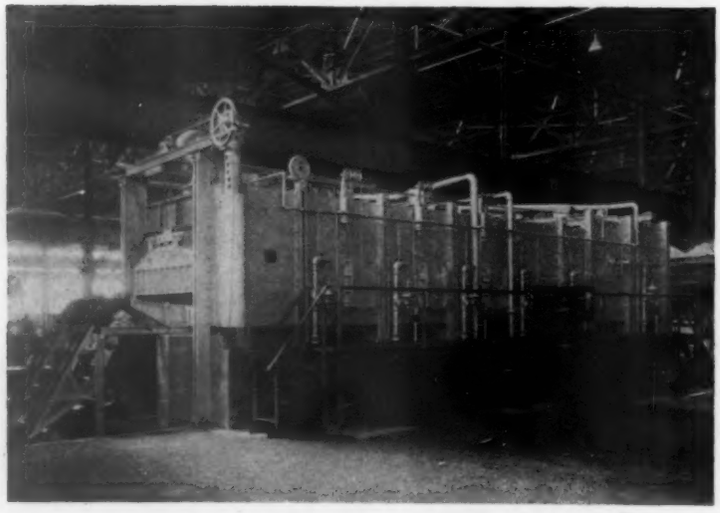
"Now, if the industry is going to have to give more attention, as I believe it is, to the development of its business so that its customers can be fully served, I think we are going to need new methods. We have at present, for instance, physical properties that are only partly used. We have possibilities of the development of future physical properties that can be used profitably. The development of the business is going to depend upon our ability to co-ordinate the operation of the commercial man or the sales department with the engineer operator, so that the sales programs can be planned to make the fullest use of the property. Everything in the sales activity that contributes to that end —that is, to stimulating the customer to make full use of the service—will have a very large effect upon the development of the business, and so upon the development of the industry.

"I think you are to be congratulated upon the work of your Home Service Committee this year. I have followed to some extent the general work of the committee, and I have been particularly interested in the development of the manual on Home Calls, because I think there you have one of the greatest factors for the success of Home Service in the future. I am a very strong advocate of taking Home Service into the home.

"There is another thing the Home Service people can do at this time—a time of investigation, a time of criticism of our industry. You can equip yourselves through education to fight the battle of utility. I don't know whether any of you have enrolled in any of the employee training courses, public relations training courses, which have been gotten out by the national associations, but if you haven't, I think you owe it to your companies to do so and inform yourselves as to the vital factors in the operation of the utility industry so you can meet the questions fairly and honestly that the customer puts to you."

Industrial Furnaces for Gas

Part X—Large Special Forge Furnaces



Walking Beam Billet Heater

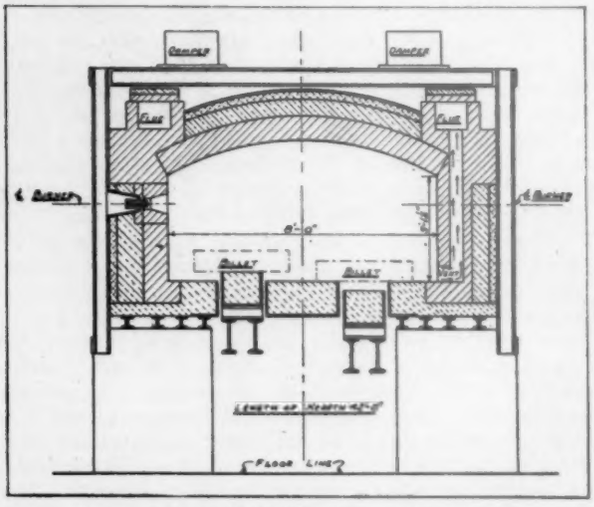
LAWRENCE E. BIEMILLER

Supervisor Fuel Sales, Consolidated Gas Electric Light & Power Company of Baltimore

LARGE special forge furnaces incorporate the most advanced features of furnace design such as: material handling equipment, automatic temperature control, automatic furnace pressure control, efficient insulation, refractories of long life, and preheated air. It is because these furnaces handle such large tonnage of metal, and use fuel in such large quantities, that all these elements of design are justified.

One type of forge furnace not so frequently encountered is the rotary hearth furnace. This is very similar to the rotary hearth furnaces described under the article in this series devoted to special oven furnaces, except that it is designed for use at higher temperatures. The rotary hearth forge is particularly well adapted to the handling of small billets, up to 6 or 8 inches in each dimension. The "in and out" handling characteristic of rotary furnaces, is very satisfactory for such billets.

Medium sized billets are largely handled in "straight thru" furnaces of various types. Such furnaces for the most part have water cooled skid rails, over which the billets are pushed by mechanical or hydraulic pushers at the charging end. The larger furnaces are usually fired from the discharge end with a small number of burners firing over the work. They may in addition have a few burners firing from the side. The end discharge forge furnace, of which a view is here shown, is a typical example of such a furnace. The billets are pushed thruout the length of the furnace at the level at which they enter, and discharge by falling down an inclined hearth at the opposite end. The furnace pictured is fired by high pressure gas thru proportional mixing burners.



Cross Section of Walking Beam Billet Heater

Such furnaces are constructed of 9 to 13½ inches of first quality firebrick; backed up with steel plates, or steel plates and 4½ inches of insulation, depending upon the load factor of its operation. For furnaces up to 12 feet wide the top is usually a normal arch, while for greater widths flat suspended arches are used.

Fuel Used Due to Water Cooled Rails

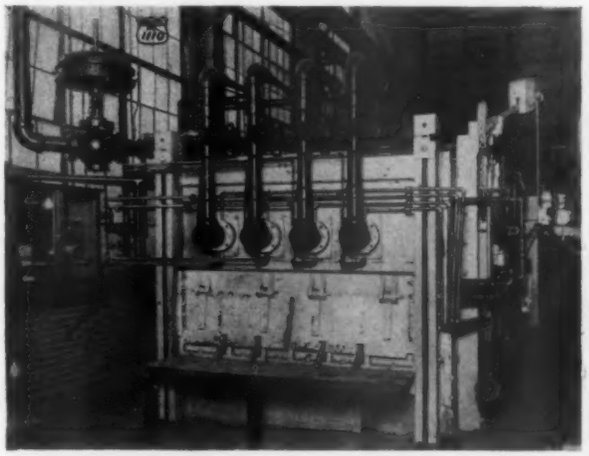
A pusher type billet heating furnace with heating chamber 24½ by 6 feet, by 20 inches high can heat 5850 pounds per hour of billets 5⅝ inches in diameter and 18 inches long. Each billet will be in the furnace 2⅓ hours, and be discharged at 2300° F. Under such conditions this furnace uses 156,000 B.t.u. per hundred pounds of material heated. The heat loss due to the water cooled rails in this case, is 1,650,000 B.t.u. per hour, or about 18 per cent. of the heat supplied.

On a larger furnace of the same type with heating chamber 45½ by 13½ feet, by 16 inches high, the production is 50,000 pounds per hour when operating on billets 4 inches square by 12 feet long. This stock can be heated to 2200° F, when using air preheated to 800° F, with the use of only 76,850 B.t.u. per hundred pounds of stock. This improvement is due to more efficient use of furnace space, since the billets are nearly as wide as the furnace; and to the economy of preheated air.

An illustration is here given of a billet furnace which is charged at one end of its longest dimension, and discharged thru side doors, mostly at the other end. This picture shows very well the special auxiliary burners at the discharge doors to compensate for door losses.

The burners use low pressure gas and air proportionally mixed.

Another type of furnace used extensively for normalizing and such heat treating operations, and also used for billet heating, is the walking beam furnace. A picture and cross section of such a furnace, used for heating brass billets, is here given.



End View of End Discharge Billet Furnace

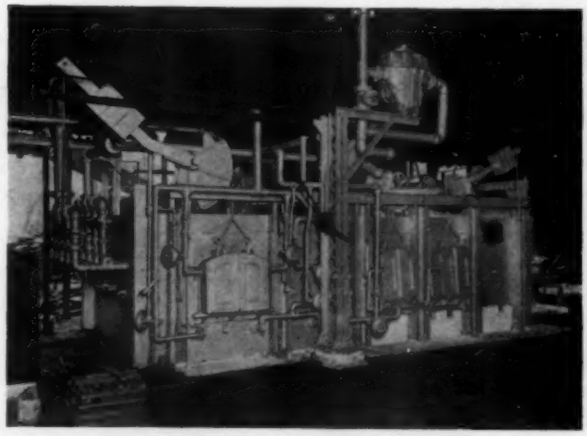
The walking beam conveying mechanism is too complicated to show on a small sketch. There are two beams in the hearth. These have a rectangular motion and lift the billets 3" above the fixed portion of the hearth on the upward stroke. On the downward stroke the moving beams drop 3" below the fixed portion of the hearth. The forward and backward movement of the beams is adjustable to suit the various sizes of billets. The beams operate alternately; that is, the left-hand beam is lifting while the right-hand beam is lowering and vice versa. The movement of the beams is obtained from two cylinders operated by pressure from an oil gear pump. One piston provides the forward and backward motion and the other the vertical motion. Each beam is mounted on two pairs of wheels, one pair near each end of the beam. The wheels are carried on levers and the levers are actuated in turn by the cylinder referred to for obtaining the vertical motion. The longitudinal motion is transmitted to the beams by means of an arm which engages against the connecting rod from the other cylinder. The beams consist of heavy structural steel members, plated over and carrying cast iron brackets to which are mounted heat resisting alloy rails on which the billets rest. The space between the rails is lined with refractory insulation.

The billets handled are from 4 to 8 inches in diameter and weigh 150 to 500 pounds. The capacity of the furnace is 28,000 pounds of copper, brass or bronze alloy per hour. An automatic charging conveyor takes the billets from the floor where they have been placed by a crane, and carries them up into the furnace. This conveyor is synchronized with the walking beam mechanism. The billets are automatically discharged down a roller conveyor.

The hearth is 42 feet long and accommodates two rows of billets. There is a 29 foot heating and a 11 foot soaking zone, each under automatic temperature control to plus or minus 10° F. Both temperature settings and production speeds are readily changed. The two walking beams may be operated in unison, or alternately.

The lining consists of 9 inches of fire brick, 9 inches of Superex and 3 inches of magnesia block. There are 10 burners in the heating zone and 4 in the soaking zone, each using gas at 8 inches and air at 1 pound pressure, mixed proportionally. The total burner capacity is 16,500,000 B.t.u. per hour. When operating at full load of 28,000 pounds per hour, heated to 1450° F, the gas usage is the equivalent of 10,125,000 B.t.u. per hour. At 25, and 50 per cent. load, the gas usage is the equivalent of 5,510,000, and 7,125,000 B.t.u. per hour, respectively.

An interesting feature of this furnace is its furnace pressure control system. Automatically actuated dampers for each control zone function in conjunction with the automatic temperature control valves. They are both open wide together, and when the automatic temperature control valves are in their off position, the dampers are almost closed. The result of this action is to proportion the vent openings of the furnace automatically to the rate of fuel combustion. This prevents the furnace chamber from acting as a flue to draw in cold air when the burners are low. Such protection is particularly important in walking beam furnaces with slots in the hearth. Not only does this pressure control prevent loss of thermal efficiency due to dilution of combustion products, but it also protects the product being heated from the effects of excess air. The dampers themselves are actuated by the air or gas pressure in the air or fuel lines, as admitted to the burners by the automatic temperature control valve.



Side Door Discharge Billet Furnace

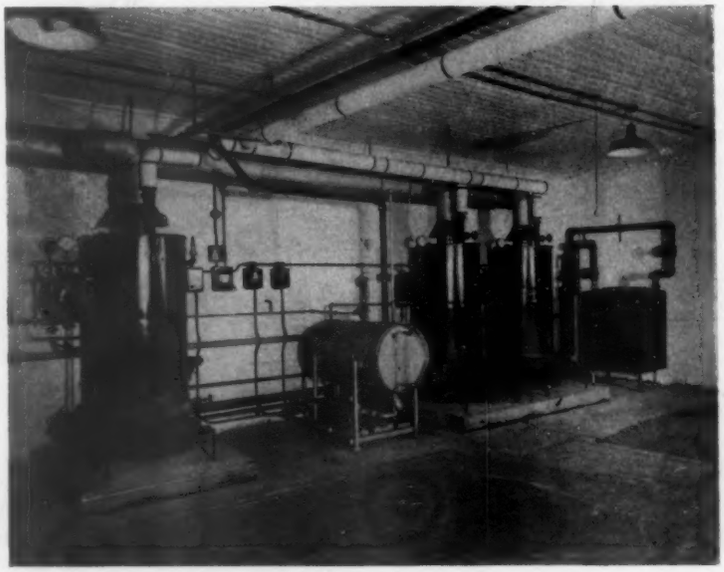
Very large individual forgings are often heated in large oven furnaces, sometimes of temporary construction. An example of such a forging is the reaction chamber of an oil cracking unit, which is 45 feet long, six feet in diameter inside, with walls 6 inches thick. The billet is pierced and forged on a mandrel successively until the desired finished dimensions are reached without a seam or joint. This method of manufacturing a reaction chamber gives increased strength and reduced corrosion. Many large machine parts to operate at high temperatures and pressures are forged for similar reasons.

In the steel mills there are large soaking pits and furnaces, for handling billets 10 inches wide by 2 or 3 inches thick by 40 feet long, and for handling slabs of 1500 to 4000 pounds, all on a quantity production basis. These furnaces are usually fired with producer, coke

(Continued on page 67)

Manufacturing Chocolate Syrup With The Aid of Modern Gas Equipment

C. W. SWENSON
Service Engineer, Consolidated Gas Company of New York

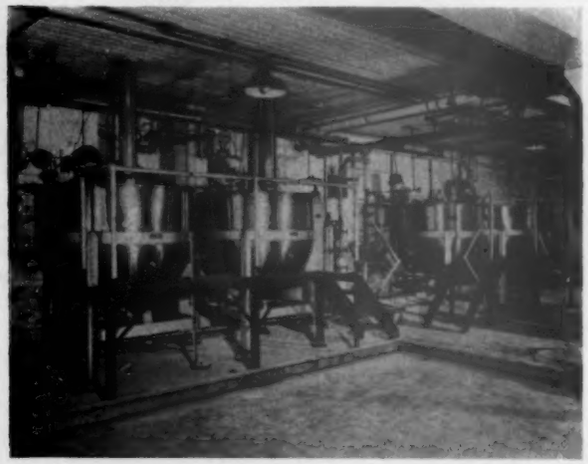


Battery of 3-10 H.P. Gas Fired Steam Boilers

GAS fired steam plays an important part in the manufacture of a new chocolate syrup being introduced by a prominent cocoa concern. A battery of 3-10 H.P. Kane boilers supplies all the necessary steam for the cooking and holding kettles, the sterilizing tank and the can dryer. The boilers are complete steam units in themselves, with automatic control and safety features. These boilers are of the fire tube type and consist of a steel shell with an atmospheric gas burner and combustion chamber under it. A jacket of sheet steel and asbestos surrounds the internal or boiler proper, but is spaced far enough from the shell to permit the hot gases to pass around the shell as well as through the tubes. This feature increases the efficiency of the boiler; effects economy in operation and decreases the per boiler horsepower floor space, all of which are valuable assets.

Gas boilers are equipped with automatic steam pressure controls which can be set to maintain any desired pressure. Each boiler also has a low water gas cut-off which reduces to a minimum the possibility of burning out the boiler due to low water. These boilers are built and approved for 100 lbs. working pressure per sq. in. and can, therefore, be operated at any pressure from 1 to 100 lbs., depending upon the requirements of the owner. A single receiver tank with individual pump units supplies all of the necessary feed water to the boilers.

These pumps automatically and economically feed water to the boilers when the steam pressure exceeds the city water pressure. The pumps draw their water supply from a receiver tank vented to the atmosphere, into which all the condensation is dumped by ordinary steam traps and to which make-up water is supplied, if required, by the float type feed water regulator built into the end. All these desirable features coupled with complete automatic control entirely relieve the boiler operator of feed water worries. Boilers and pumps rest upon suitable fireproof bases and the boilers are properly flue connected to the outdoors.



Steam Jacketed Heating-up and Cooking Kettles

Steam Layout Carefully Planned

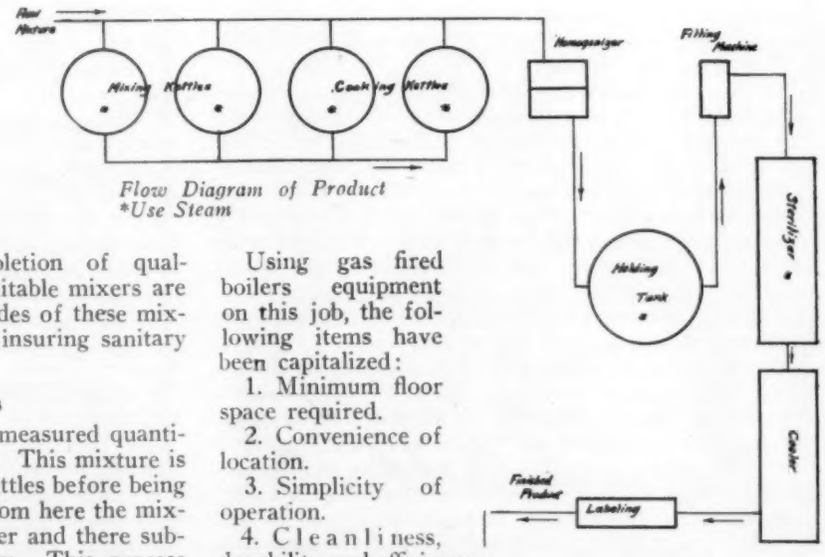
All of the steam and return piping in this plant has been carefully laid out so as to eliminate any possibilities of pockets or troublesome vacuum pulls. Each pipe line has been insulated with 85% magnesia asbestos covering and all heated equipment similarly insulated where possible.

All metal contacts with the syrup are stainless and non-corrosive materials, such as monel and other nickel alloys. This fine equipment, and extreme care in processing and controlling, account for the preservation of the chocolate syrup in its finest condition.

The chocolate drinking public are fully protected by the sanitary conditions prevailing throughout this plant. All holding and processing kettles are thoroughly washed and cleaned after each day's run. When the day's production is over, the sanitary pipe lines and pumps handling the syrup, are taken apart and undergo a complete cleaning. Each day before starting new batches, all syrup handling equipment is thoroughly sterilized with live steam, further eliminating all possibility of contamination by dirt and germs. In line with these sanitary plant conditions, all of the process steam

is supplied from boilers fired with the ideal fuel—GAS. With gas equipment it is an easy matter to keep things clean and dustless throughout the entire plant.

To eliminate errors due to the human element, temperature control instruments are installed on all kettles and sterilizers, thus insuring uniformity as well as high quality of the product. In further completion of quality control in producing this syrup, suitable mixers are used with individual motors. The blades of these mixers are of monel metal, thus further insuring sanitary conditions.



Flow Diagram of Product
**Use Steam*

Measured Quantities

The product consists essentially of measured quantities of sugar, cocoa and filtered water. This mixture is stirred and heated in steam jacketed kettles before being pumped to the cooking containers. From here the mixture goes to a double stage homogenizer and there subjected to a high pressure and velocity. This process produces a syrup of extreme smoothness and perfect emulsification. After the homogenizer the syrup goes to a steam jacketed monel holding tank and then to an automatic filler. The syrup has then been placed in cans which gravitate from the sealing machine to the intake elevator of the sterilizer and cooler. Here the cans travel on a carrying unit of the reel and spiral type through the whole length of the sterilizer tank. From this tank the cans pass through a cooler and then are labeled to be ready for the market.

Using gas fired boilers equipment on this job, the following items have been capitalized:

1. Minimum floor space required.
2. Convenience of location.
3. Simplicity of operation.
4. Cleanliness, durability and efficiency.
5. Automatic, requiring no engineer or fireman.

Due to manufacturing a product whose peak requirements come during the summer months, these industries have earned an exceptionally fine fuel rate. Because of this, the operating expenses, including the facts that no engineer or fireman is required, are much less than with any other fuel available.

Using such modern and well controlled equipment and operating under such fine sanitary conditions, marks this product as the ultimate in food perfection.

Here's How

Otto C. Reimann, New Orleans Public Service Inc., boosts his gas water heater sales by seeing more than half his prospects after dinner

REALIZING the need for complete hot water service in the home, I endeavor to contact as many people today as possible and explain to them the many advantages of hot water service. Experience has taught me that selling is a matter of polite and enthusiastic suggestion. During the last six months of 1930 I was able to secure orders for 127 gas fired automatic water heaters, of which seventy-four orders have been placed through my own company, the balance being sold through the various plumbers and dealers.

It has been said by competent authority that there are forty-six distinct needs for hot water service in the home. Therefore, this would provide forty-six avenues of approach to an order for a water heater.

Our company is operating on a cooperative basis with seven of the leading water heater manufacturers, through their local distributors. Each month one particular kind of heater is featured and major effort is confined to this one type of heater. However, should a customer express a preference, we would not attempt to break down whatever confidence might already exist in his mind, but would attempt to develop in the mind of this prospect the features and advantages of this particular heater.

Our company has a deferred payment sales plan

that enables the purchaser to budget the expense of the heater over a reasonable period of time, and this also is helpful in closing sales.

We also have excellent advertising helps and copies of current ads are necessarily carried by salesmen and can be used to good advantage in closing sales. Now for an average day's work: Report to office at 8:15 A.M. Attend sales meeting. Leave office at 8:45. Arrive in territory at 9:15 and devote the entire morning to systematic canvassing for prospects. I interview an average of twenty-five people each forenoon, telling them my enthusiastic story of hot water service and the advantages that would accrue to them through the ownership of a gas fired heater carrying the approval of the American Gas Association Testing Laboratories. The afternoons are devoted to call-backs, appointments and calls on users. The satisfied user is a most excellent source of prospects for future sales and too much cannot be said in favor of a close follow-up of all users. At least three evenings each week are devoted to appointments to discuss this all-important topic of hot water service with Mr. and Mrs. Prospect. At least fifty per cent of my sales are actually closed after dinner and the salesman failing to take full advantage of this particular phase of the game is doing an injustice to himself and his employers.

Our company, of course, maintains an up to the minute floor and window display of the various water heaters sold by us, and I find this of real value to myself as an outside salesman. First, it helps materially to create in the minds of Mr. and Mrs. Public the need for hot water service, and in addition to that develops rather clearly in their minds the physical apparatus necessary to obtain this hot water service.

While the salesroom is not open after dinner, the outside salesmen are permitted to bring prospects into the sales room until midnight. Therefore, if I find that I am unable to close an order without physical demonstration, I make every effort to bring the prospect to the sales room where comparisons and satisfactory selections may be made.

No magic or other mysterious agencies are necessary equipment to the sale of gas fired water heaters. The essential equipment for this work comprises an adequate knowledge of the merchandise and not only of willingness but of eagerness to spread the gospel of this service. In other words, knowledge of merchandise plus work equals satisfactory sales.

Sell The Full Line

DECEMBER is an ideal month to sell the full line of gas appliances and, as we view it, December, 1931 is a good month to crash the average customer's frozen assets by a sale that offers him the unusual. In staging an unusual sale however, do it on your complete line; include ranges, refrigerators, radiant gas heaters, ironers, garage heaters, water heaters, incinerators and what have you. Move all of your stocks onto the sales floor and dress them up with special price tags and display cards featuring your Christmas Special Offer.

A plan that worked out wonderfully well for the Laclede Gas Light Company, St. Louis, a short time ago may be used as a basis for such an activity. The plan devised by Messers. Lewis, Terry and Vandergrift was called a "Double Duty Dollar Sale" and the double duty dollar idea was applied to the full line of appliances sold by the company.

"In planning this campaign on gas appliances we felt that it was necessary, because of existing business conditions, to give the sale a name which would indicate that the sale offered out-of-the-ordinary bargains. Also, we realized that in order to put the sale over it would be necessary to offer a genuine bargain on all appliances included in the sale. This bargain took the form of double credit for down payments. In other words if the down payment on an article was $10,00, the customer was given a credit of $20.00, or double the down payment," said Mr. Norman B. Terry in talking about the plan.

This double duty plan was featured "worked-out" in all advertisements run in the St. Louis daily newspapers and was also featured in the half dozen window display advertisements in the company's main store and in branch stores in the various parts of the city. Just how the sale was played up may be seen from the advertisements reproduced herewith.

7 more days
Seven more days for your dollars to do double duty. One week in which to save by getting double credit for your down payments. The Double Duty Dollar sale on gas ranges, water heaters and refrigerators closes June 30. Here is an opportunity to get one or all of these home appliances at a price in keeping with your 1931 budget. Enjoy the time-saving efficiency of a new gas range, the glorious comfort of plenty of hot water or the convenience and healthfulness of perfect automatic refrigeration. Don't deprive your home of these essentials to good living. Be wise and thrifty. Buy now while you get double duty from your dollars.
The Laclede Gas Light Co.
Olive at Eleventh
CEntral 3800

A sale of this kind not only affords the dealer a worth while Christmas business in new appliances but it should also enable him to reduce his stocks of items that have been slow movers or which he expects to discontinue in 1932. In other words a sale of this kind is just about what the customer is looking for right now, so you satisfy him and, aside from that, it affords you an ideal opportunity to build up your December sales and cut your inventory down—and thus start the new year in a fair way with new merchandise at new prices.

Get double credit
for your down payment
with double duty dollars
HERE'S your chance to get double credit for your down payment on an Electrolux gas refrigerator. It's an opportunity to get an Electrolux on thrifty terms now when the hot weather is just starting. During this June sale your dollars do double duty. For instance, suppose you wanted the popular Hostess model Electrolux. You make a down payment of from $10 to $20, we credit you with an amount equal to twice your down payment, the balance can be paid in 24 months.
ELECTROLUX
THE Gas REFRIGERATOR
This double-duty dollar sale is effective only during the month of June. It includes all Electrolux models ranging in size from the "New Yorker," with a shelf area of 5⅞ square feet to the "Country Club" model with 32⅝ feet of shelf space.
Here's an example of the
Double Duty Dollar Plan
The regular price of the Hostess Electrolux is....$273.00
You make a down payment of $20 and we credit you with an additional $20 (Double Duty Dollars)..... 40.00
Balance to be paid in 24 months.....$233.00
This plan operates the same way on all Electrolux refrigerators. The popular Hostess model is used in this example but the same arrangement is effective on all other models.
Electrolux is the gas refrigerator that all St. Louis is talking about. It is the refrigerator that operates without any moving parts, that makes no noise, never needs repairs nor vacation servicing because there is nothing to get out of order. The beautiful Electrolux cabinet embodies all the latest improvements such as special insulation equal to 9 feet of brick, ribbon type shelves, bonded cement and chromium metal. The refrigerating apparatus is sealed in an air tight one-piece unit. Electrolux is operated by a tiny gas flame and a trickle of water which makes the operating cost approximately 3c a day.
The Laclede Gas Light Co.
OLIVE AT ELEVENTH
CEntral 3800

In connection with the Laclede Company's sale it is understood that the quota set was greatly exceeded and that the advertising expense was somewhat less than the amount appropriated—and there can be no doubt that the sale started a buying movement that will be profitable for some time to come.

Another gas man who is seeking ways and means to build his gas load per domestic customer told us the other day that he is planning a customer's gift activity for the ten days preceeding Christmas. His plan is to advertise that all who purchase gas appliances during the ten days preceeding Christmas day will be presented with a useful gift free of charge. It is his intention to present all purchasers of gas ranges, water heaters, radiant heaters and the so-called major appliances with their choice of either a cake griddle or a waffle iron. To those purchasing an ironing machine he will present a gas laundry stove and, aside from those who purchase appliances, he is working out a plan to present all comers with a gas toaster. This toaster he said would be wrapped in a special Christmas Gift wrapper and would also contain a number of toast recipes. Not a bad idea and one that may be enlarged upon or revised to suit the man who is looking for ways and means to popularize gas and to build up his load per domestic meter.

Soldiers of Thrift
. . . are these
Double Duty
Dollars
NOWADAYS smart people buy carefully. They buy only those things which bring the most comfort, satisfaction and happiness . . . and they buy where their dollars bring the most value. That's why so many St. Louisans are taking advantage of this Double Duty Dollar Sale. An automatic supply of hot water, always hot and always ready, is one of the most enjoyable conveniences you can put in your home. During this sale you can buy an American Ace or Ruud water heater and make your dollars do double duty.
Regular price of heater (Price includes installation, delivery and connection) $108.00
You make a down payment up to 10% 10.80
$ 97.20
We credit you with an amount equal to your down payment (Double Duty Dollars) $10.80
Allowance for your old heater 10.00
$20.80 20.80
Balance to be paid in 18 months $ 76.40
Other water heaters ranging in size and price can be purchased on this same plan with down payment as low as $5.
The LACLEDE GAS LIGHT COMPANY
OLIVE AT ELEVENTH
CEntral 3800
DURING THIS MONTH DOUBLE DUTY DOLLARS APPLY ON RANGES, REFRIGERATORS AND WASHERS IN ADDITION TO WATER HEATERS.

Copies of Bulletin No. 230 may be obtained without charge by addressing the Engineering Experiment Station, Urbana, Illinois.

Humidification for Residences

IN VIEW of the extended interest which has recently developed concerning humidification for residences, the demand for some single source of information, easily available, has become urgent. The object in the preparation of Bulletin No. 230 of the Engineering Experiment Station of the University of Illinois was, therefore, to consolidate certain useful information from various sources, and to present experimental results which have been obtained by the Engineering Experiment Station incident to cooperative researches with the National Warm-Air Heating Association and with the Institute of Boiler and Radiator Manufacturers.

Industrial Furnaces for Gas

(Continued from page 63)

oven and natural gas, or oil. The air is frequently regenerated or recuperated.

Closely controlled fuels such as manufactured and natural gas, are being used more frequently for forging. On a recent conversion of a billet furnace to the newest luminous flame gas burners, the fuel consumption was reduced 30 per cent. while the production loss due to scaling was cut 96 per cent, the number of hammer blows reduced 60 per cent., and the amount of stock used cut 8 per cent. The proper furnace design will see increasing recognition of the advantages of gas in such respects.

AMERICAN GAS MERCHANDISING ALMANACK

December

DECEMBER is the month that affords the gas appliance dealer an opportunity to play up his full line of appliances. Advertising should feature the gift idea; gas ranges, refrigerators, space heaters, dryers, toasters, griddles, waffle irons and ironers may all be advertised as family gifts.

Stores and windows should be decorated early in the month, using green, red and silver to form wall drapes and settings for appliances. Appliance price tags may also be printed in color.

Poinsettias and Holly make ideal decorating material, while the symbols of the season—Santa Claus, the Christmas tree, stars, etc—may be used profusely. The impulse to give impels folks to stop, look and buy, if a bit of thought is given to suggestive selling. A refrigerator for mother or a new gas range are always worth while suggestions.

Display your full line, make your store look the part of the holiday season, price all merchandise and if you have a line or lines that you expect to mark down during your January Inventory Sale, mark them down now, for folks are shopping for prices. High priced appliances should be displayed on the floor but we are inclined to think that if you display some of the lower, more popular, priced items in your window, you will be tuning into the times. However, do not let price dominate your sales story, printed or otherwise. The folks who formerly purchased the medium priced merchandise, as well as the well-to-do who always shopped, are seeking something in the way of a lower price, yet the dominant ideas that they carry in their mind is, "What will it do for me?"

1—Tues.	Gas first used for light 1816; 115 years ago.
2—Wed.	Lincoln delivered his last message to Congress, 1864.
3—Thur.	Illinois, the great prairie State, admitted to the Union, 1818.
4—Fri.	Thomas Carlyle, historian, born, 1795.
5—Sat.	**Change store Window displays tonight.**
6—Sun	**Run special holiday advertisement in newspapers.**
7—Mon.	Delaware (First State) ratified the U. S. Constitution, 1787.
8—Tues.	Joel Chandler Harris, author, born, 1866.
9—Wed.	**Conduct Christmas Baking Contest—Cakes and Cookies.**
10—Thur.	**Continue Christmas Baking Contest.**
11—Fri.	**Change displays in store and in windows.**
12—Sat.	Arthur Brisbane, writer, born, 1864.
13—Sun.	**Run Christmas newspaper advertisements.**
14—Mon.	George Washington died, 1799.
15—Tues.	**Conduct Pie Baking Demonstration in store.**
16—Wed.	Boston Tea Party, 1773.
17—Thur.	**Run Special newspaper advertisement.**
18—Fri.	**Conduct store demonstrations.**
19—Sat.	**Change window displays.**
20—Sun.	United States took possession of Louisiana, 1803.
21—Mon.	Landing of the Pilgrims, Plymouth, Mass., 1620. Shortest day of the year.
22—Tues.	Winter begins today—**Play-up this fact in a radiant heater ad.**
23—Wed.	**Final mark-down on Christmas specials.**
24—Thur.	**Have store open in the evening.**
25—Fri.	Christmas—A Very Merry Christmas to you is the *American Gas Journal's* wish. May 1932 see you doing great things.
26—Sat.	**Go over plans for January activities.**
27—Sun.	No work—a day of rest.
28—Mon.	Woodrow Wilson born, 1856.
29—Tues.	**Line-up inventory.**
30—Wed.	Al Smith, Statesman, born, 1873.
31—Thur.	Edison conducted first public demonstration, 1879.

The Legal Side of Our Industry

Leo T. Parker discusses

- **Validity of Franchise**
- **Status of Property in City Streets**
- **Liability for Water Pollution**
- **Used Equipment Sales**
- **Furnishing Safe Working Place**
- **Employe's Funeral Expenses**
- **Damage Caused by Flood Water**
- **Drilling Contract Status**
- **Where to File Suit**

Franchise Held Reasonable and Valid

IT is well known that contracts are void which are in restraint of trade, which lack mutuality. Sometimes franchises are deemed in restraint of trade.

Grants of the right or privilege to use public streets for the purpose of maintaining and operating railroads, electric light power lines, system of waterworks, gas pipe lines and the like, are franchises.

A city has two classes of powers: One, legislative or governmental, in the exercise of which it acts as a sovereign; the other, proprietary or business, in the exercise of which it acts and contracts for the private advantages of the city and its inhabitants. In the exercise of powers which are strictly governmental, the officers of the city may make no grant or contract which will bind the municipality beyond the terms of their offices, because they may not lawfully circumscribe the legislative powers of their successors. But, in the exercise of the business powers of a city, its officers are limited by no such rule and they may lawfully exercise these powers in the same way *and they are governed by the same rules as a private individual or corporation.* For this reason, in order to induce companies to install expensive equipment it is, as a rule, necessary that the officials grant to such companies exclusive rights for a reasonable period. Franchises of this nature are valid.

For instance, in Griffin *v.* Oklahoma Natural Gas Corporation, 37 F. (2d) 545, it was disclosed that a city entered into a contract with a gas company named the Kirk Company whereby the city agreed to purchase from this company all the gas required by the city for fuel in the operation of its waterworks power plant, and the city agreed to use only natural gas for fuel in the operation of such power plant. The contract contained a clause which relieved the gas company from failure to furnish the gas where such failure resulted from causes beyond its control. On the same date the city and the Kirk Company entered into another contract by the terms of which the latter agreed to furnish gas to the inhabitants at a stipulated cost and gave the Kirk Company exclusive right for five years to furnish gas to its water plant and to the inhabitants.

Suit was filed by certain citizens on the contention that both contracts are invalid first, because the agreements lack mutuality, since the Kirk Company is relieved from liability for failure to furnish the gas for causes beyond its control, and second, that the franchise which gave the Kirk Company the exclusive right to furnish the gas for the water plant and to the inhabitants for five years is a restraint of trade since it prevents other gas companies, which may desire to do so, to furnish gas for these purposes. However, it is important to know that the Court held the contracts valid, stating the following important law:

"A franchise is a special privilege conferred by government upon individuals and which does not belong to the citizens of the country, generally, of common right. . . . The grant of a right to maintain and operate public utilities within a municipality and to exact compensation therefor is a franchise. . . . If the restraint were reasonable, under the particular facts and circumstances of the case, the contracts are not invalid because of such restraint. . . . We think, in view of the expenditure necessary to be made to furnish gas to the city and the fact that the city was the only customer for such gas, an exclusive contract for a period of five years was reasonable. . . . A contract to furnish such gas, as shall be required or consumed by an established business, is a contract to furnish an ascertainable quantity of gas and is valid. . . . The provisions in the contracts, exempting the Kirk Company and its successors from failure to furnish gas due to causes beyond its control, did not render the contracts void for want of mutuality. . . . We conclude that the contracts were not void for want of mutuality."

Legal Status of Gas Companies Property in City Streets

Various Courts have held that a city may tear up its streets for making necessary improvements and that, in the absence of state laws, the city is not liable for payment of expenses resulting to public utilities or other companies having legal rights to use such streets.

For example, in Louisville Gas Co. *v.* Commissioners of Sewerage of Louisville, 33 S. W. (2d) 344, the commissioners of a city decided to build a sewer through a street. Much objection was raised to the cutting of an open ditch through the street as this meant the removal of street cars and other utilities and the interruption of traffic. After a careful consideration of the situation the commissioners determined to construct the proposed sewer by driving a tunnel beneath the surface of the street, as in this way the traffic upon the street would not be interrupted. A contract was duly made with a construction company to drive the tunnel and to construct the sewer. This was done while traffic went on as usual on the street, but some of the soil beneath the surface of the street and above the tunnel sank at various points, and as the result of such sinking the pipes, mains and conduits of the Louisville Gas Company were caused to sag and to break, requiring that company to immediately repair them, which it did at a considerable cost.

The gas company sued the city for damages. The gas company did not contend that the work was not carried on in a careful or prudent manner or that there was any negligence of the contractor.

It is interesting to observe that the higher Court refused to hold the gas company entitled to recover cost of repairing its pipes, mains, etc. This Court said:

"Appellant (gas company) placed its pipes in the streets of the city, subject to the right of the public, through its proper municipal authorities, to make such use of the streets as might be necessary to protect the public health and safety. The city authorities could not by contract deprive the city of the power to make, in future, such use of the streets as the public health or the public safety required, and the gas company took its rights under its franchise, subject to these limitations. . . . Under the authorities above cited appellant (gas company) placed and maintained its pipes in the street subject to the police power of the city. It did not have an absolute property in the street or the right absolutely to maintain its pipes in the street. Its rights were subject to the police power of the city."

Liability for Water Pollution

Frequently gas companies have controversy with municipal officials over water pollution resulting from operation of gas plants. Usually a Court will issue an injunction against further conduction of the plant in a manner adapted to pollute water intended for domestic purposes. However, damages are not allowable directly from a firm which pollutes water and a company under contract with the city to purchase pure water.

For illustration, in Pure *v.* Boyle Co., 26 S. W. (2d) 161, a city, which obtained its water supply from a river for distribution and sale to its inhabitants, agreed in writing to supply pure water to an ice company for the purpose of manufacturing ice. Some time later a company began to discharge into the river large quantities of waste oil and other impurities, thereby polluting the stream and rendering its waters unfit for the manufacture of ice. The ice company filed suit against

the company guilty of polluting the water. This Court refused to hold the ice company entitled to a judgment, saying:

"The interest of the ice company in said waters emanated exclusively from their contract with the city, and was but an indirect interest. Harm from the wrongful acts of the plaintiff came to the defendant *indirectly* through the contractual relation which existed between them and the city. The injury is too remote to constitute a cause of action."

If the ice company had sued the city it may have recovered damages. Also, the city may have obtained an injunction to prevent further pollution.

The Law of Used Equipment Sales

It is well settled that a gas company which purchases new equipment or machinery has an *implied* guarantee that the subject of the sale is reasonably worth the purchase price. However, this rule is *not* applicable with respect to used or second-hand materials.

For instance, in McDonald *v.* Dorfman, 32 S. W. (2d) 443, it was disclosed that a seller sold and delivered used supplies, materials, and casings, for the sum of $3,887.32 for the purpose of drilling oil and gas wells and taking care of the production therefrom on oil and gas leases. The purchaser refused payment on the contention that the pipe and equipment was not reasonably worth the purchase price. However, the Court held the purchaser liable for full payment, and said:

"It is undisputed that the property, the casing, was second-hand. It was known by the parties to be second-hand and was sold as such. It is undisputed that the purchaser had the opportunity to inspect the property. . . . When one buys second-hand property, knows it to be second-hand, and either inspects it or has the opportunity to do so, there is no implied warranty."

Duty of Employer to Furnish Safe Working Place

The duty of an employer to use ordinary care to provide his employe with reasonably safe appliances and machinery does *not* require him to furnish the newest and best appliances. In other words, if the employer furnishes appliances that are *customarily* used by *ordinarily prudent persons* in the same business, he is *not* negligent. However, such custom must be uniform and if there is any material variation therefrom on the part of the employer, the question of the employer's liability must be decided by a jury.

For example, in the late case of Birdsong *v.* Jones, 30 S. W. (2d) 1094, it was shown that an employe was injured as a result of his employer's equipment not being provided with a safety guard usually used at similar places. Therefore, the jury held the employer liable in damages.

Gas Company Liable for Employe's Funeral Expenses

Generally speaking all reasonable laws intended to benefit injured employes, or their dependents, are valid and enforceable and the Courts will not relieve employers from obligation thereunder upon mere technicalities.

For instance, in Wisconsin Gas Co. *v.* Industrial Commission, 232 N. W. 699, it was disclosed that a state law provides:

"In all cases where death proximately results from the accident the employer or insurer shall pay the reasonable expense for burial, not exceeding two hundred dollars."

A gas company employe was killed. The counsel for the company argued that it should not be liable since the employe had no dependents. Notwithstanding this contention the Court held the law valid and enforceable, saying:

"The evident legislative purpose was to require the employer to pay certain sums into the state treasury in the cases of the death of employes leaving no one wholly dependent upon them. The language used in the original act and in the various amendments sets up standards by which that amount is to be ascertained . . . when there are no dependents, the state under the statute receives the entire amount subject to the limitations prescribed. There is a greater justification for the provision requiring payment to the state in the event the deceased employe leaves no dependents than in cases where he leaves persons partially dependent upon him. To hold that partial dependence must be established as a prerequisite to the payment of any amount to the state would defeat the very evident purpose of the statute."

Gas Company Liable for Damage Caused by Flood Water

When making excavations or digging trenches the law requires gas companies to exercise care to prevent damage to adjacent property in the event a heavy rain suddenly floods the land. Negligence to provide for the escape of this water may result in a verdict against the gas company for damages caused adjacent property.

For example, in S. Kosson & Sons *v.* Union Bldg. & Const. Co., 151 Atl. 633, a property owner filed suit against a contractor, water company and gas company for damages resulting from water and dirt washing through the interstices of the foundation wall into his cellar.

The testimony disclosed that a contractor was under a contract with a city to widen a street by setting back the curb line. The gas company was *contemporaneously* relaying its connections. Some months *earlier* the water company had reset its water box to the line of the proposed curb.

The surface water from the building leaders regularly flowed across the sidewalk to the curb and thence by gutter to the city sewers. The contractor dug a trench two feet distant from and parallel with the existing curb for the purpose of ultimately setting a new curb. In so doing he should have formed a gutter to carry the sidewalk flow over that trench and into the old gutter. He did not do this although a rainstorm began while the workmen were actively on the job and as a consequence the trench, during the ensuing storm, formed a reservoir from which water worked back into the cellar. At the same time the gas company dug a trench and failed to provide an outlet. The water from this trench flowed into the cellar. The higher Court relieved the water company from liability, but indicated the liability of both the contractor and the gas company, saying:

"There appears to have been no reasonable necessity for either of these defendants (contractor or gas company) to dam the gutter so that this outlet could not function. The gutter was there for the purpose of carrying water. The reason for free flow and the probable result of stoppage were obvious. Given a sufficient rainfall, an overflow was inevitable, nor would it require a deluge to produce that result. . . . Concerning the Passaic Consolidated Water Company, it may be gathered from the evidence that, from six months to a year before the damage to plaintiff's property, a water box—an apparatus for turning on and off the consumer's water supply—belonging to that company had been installed near the curb. The refilling of the trench and the work generally had long been completed."

Drilling Contract Held Void

It is well settled that a contract is invalid, unless all of the obligations of the contracting parties are clearly defined. It is important to know that this rule of the law is applicable to all contracts. An example of one kind of contract is illustrated in Ladd *v.* Foster Inv. Co., 40 F. (2d) 497. Here it was shown that a property owner and a gas company entered into a contract whereby the former agreed to lease to the latter, for drilling purposes, his property of 300 acres. The contract did not specify the amount of royalty, the time drilling was to commence, the rent due for delay, or other terms of a complete lease.

In holding the contract invalid, the Court said:

"In order to be binding, it was essential that all the terms and conditions of the latter be specified, and as this was not done, the contract was not enforceable."

Where to File Suit

It is well known that many states have enacted laws requiring corporations of other states to perform certain acts and meet prescribed requirements before suit can be filed. However, if such a law has not been passed and neither does the law expressly give the corporation, which desires to file suit, this right, the Courts may imply that the corporation has such right. In other words, the liability of a foreign corporation to be sued in a particular state need not be distinctly expressed in the statutes of that state, but may be implied from a grant of authority in those statutes to carry on its business there. Another important point of the law is that the term "the business done by said corporation in this state" does not mean the single transaction by which the liability was incurred. It means the business done *generally* by the corporation in this state, and by the doing of which the corporation is deemed to be in the state, under the protection of the laws of the state, and subject to the jurisdiction of the Courts of the State.

(*Continued on page 82*)

In the big Chicago Line

Completion of the Continental Construction Corporation line by which Texas gas is brought almost a thousand miles to Chicago, is a real achievement for the industry. The entire system, comprising 1250 miles of pipe, is capable of delivering approximately 175,000,000 cubic feet daily and will serve industrial and domestic users in numerous towns and cities, in six different states.

Many factors entered into the accomplishment of such a tremendous undertaking. One of the most important of these was the availability of pipe adequate in diameter and strength, without excessive weight.

In pipe-line projects of magnitude, engineers and field men rely on the uniformly satisfactory working qualities, the unfailing strength and general durability of NATIONAL Pipe, established by impressive records from every important field. Such records account for a large portion of the Continental Line being composed of NATIONAL—

America's Preferred Line Pipe

NATIONAL TUBE COMPANY • Pittsburgh, Pa.
Subsidiary of United States Steel Corporation

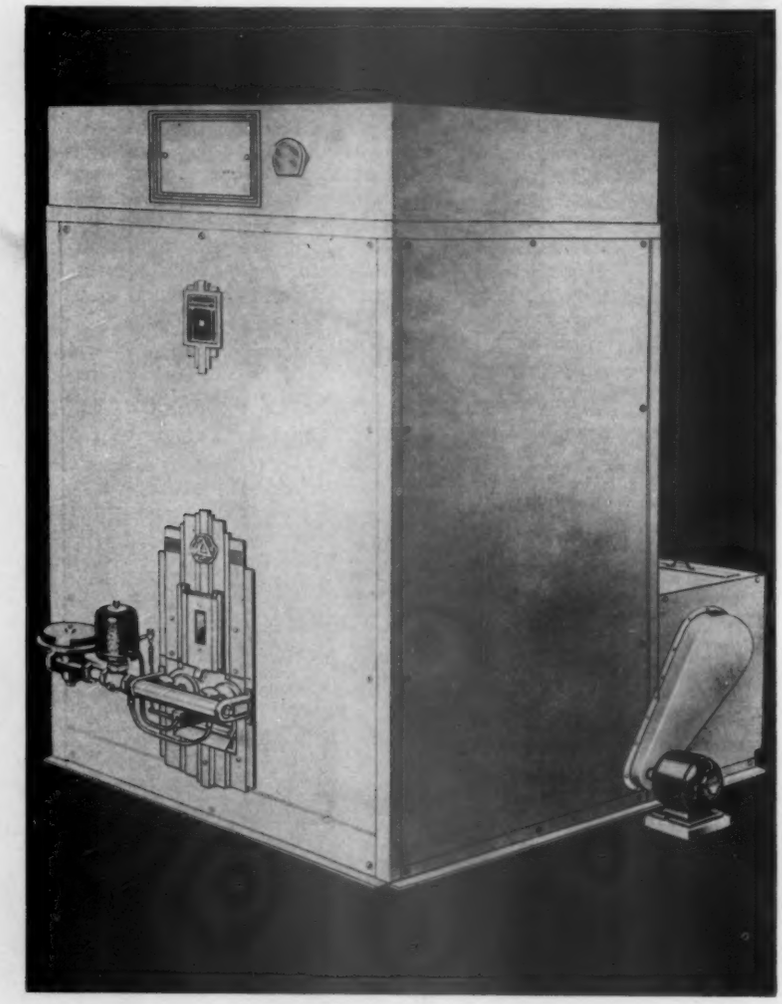
NATIONAL PIPE

EQUIPMENT NEWS

New "Heatmaster" Warm Air Furnace

The Surface Combustion Corporation, Toledo, O., has recently announced the new Heatmaster warm air furnace to the Gas Industry.

The new Heatmaster incorporates every feature necessary to provide mechanically circulated, cleansed, humidified warm air for the modern home... with exceptionally pleasing and modern design, in conformity with present day trends toward livable basements.



Columus "Headmaster"

The unit is completely automatic with blower control and overheating temperature limit control, electric motor valve, thermostatic regulation, automatic gas pilot, and pressure regulation.

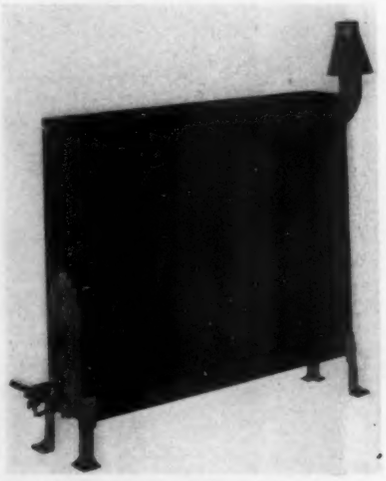
Warmed and filtered air is circulated by two noiseless centrifugal blowers through the duct system. Filtering is of the dry type, with removable screens that are easily cleaned. The humidifying pan is located within the casing with automatic float tank to control the water level. New sectional cast iron burners are used to provide the necessary combustion. Special rust resisting, terne plated sheet steel is used in the side and flue radiators for Natural Gas. Special acid resisting alloy sheet steel is furnished for Manufactured Gas. It is made in sizes for medium and larger size homes.

New Garage Heater

This company also announces a new gas fired garage heater.

This unit, designed to sell at a moderate price, is intended to capitalize on a growing tendency toward heated garages during the winter months, especially in the Northern states.

It is made in one size only, with a 32,000 B.t.u. input per hour. Burners extend the entire length of the chamber eliminating hot spots. Radiation shields prevent the outer casing from becoming hot. The heater is absolutely safe from fire. It is modern in design and attractive in appearance, compact and requires small floor space. The Garage Heater may be furnished with thermostat control. Burner adjustments are easily made from the outside of the heater. Extra heating surface makes



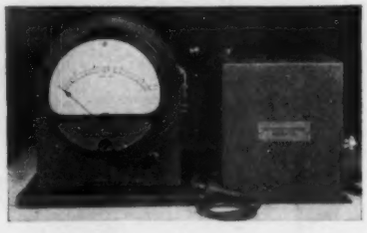
Surface Combustion Garage Heater

for unusual efficiency and economy of operation. It is made for operation with either manufactured or natural gas. The unit has an overall length of 40 inches and a height of 37 1/8 inches.

Telemco System for Remote Indicating and Recording

The Pittsburgh Equitable Meter Company, Pittsburgh, Pa., announces a means for remote indicating and recording through the use of the Telemco System.

The purpose of the remote indicating device is to measure or indicate a quantity or magnitude, such as gas pressure, water level, oil pressure, energy, flow



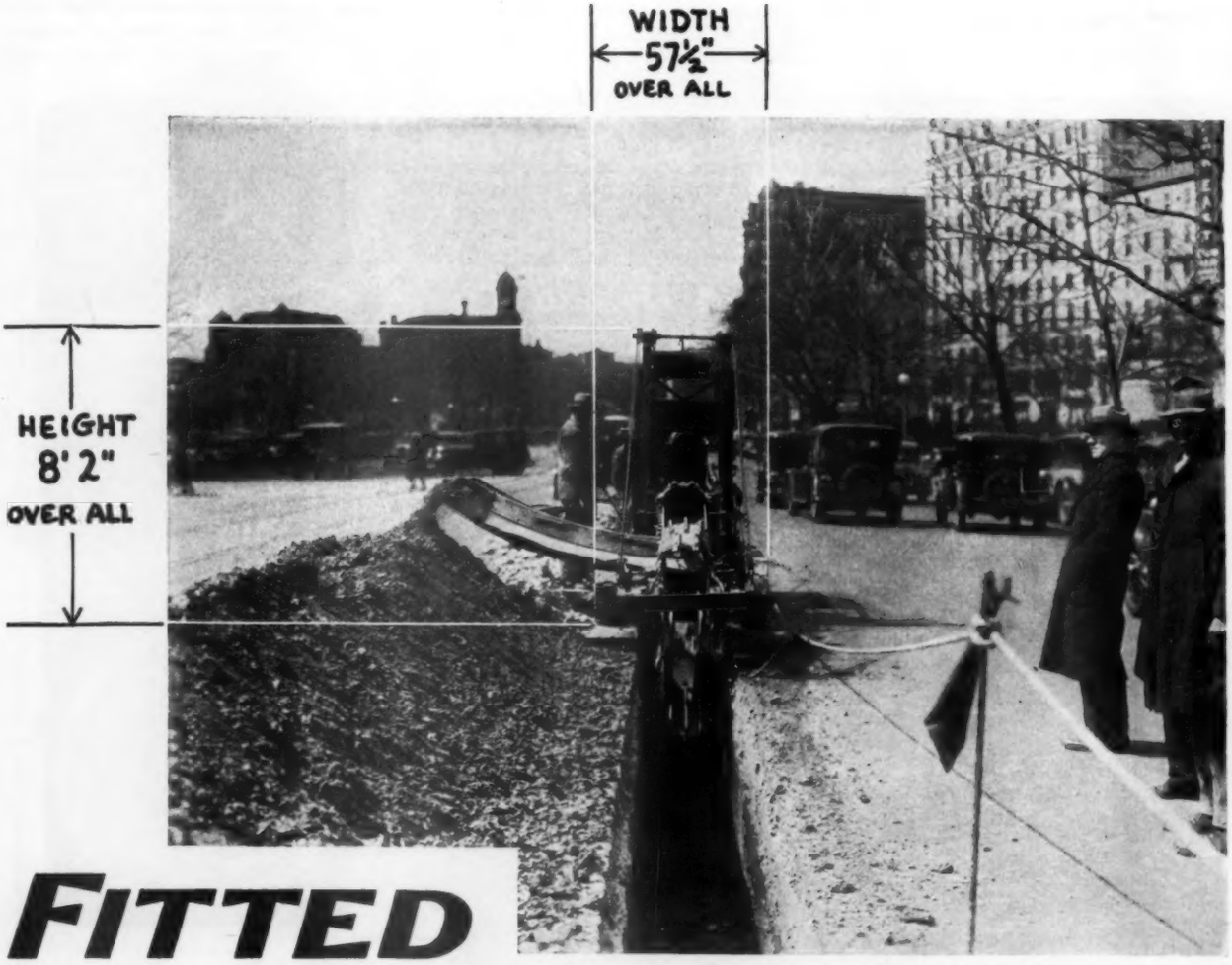
and the like, at a point remote from the locality at which such a quantity or magnitude exists.

The Telemco System consists of a transmitter and a receiver. The transmitter to be placed where the measurement is to be taken and the receiver where this measure is to be indicated or recorded.

It will be seen that only two connecting wires are needed between the transmitter and receiver, and in many cases where the distance is not too great a single wire with ground return may be used.

The current used, namely 10 milliam-

(*Continued on page 74*)



FITTED . . to Your Work !

Gas distribution work *demands* a trencher of maximum compactness.

The Cleveland Baby Digger, the pioneer small trencher, is but 57½ inches wide and only 8 feet 2 inches in height. These are the two important dimensions, providing minimum clearance on *both* sides of the machine and requiring minimum headroom.

Right of way past poles, trees and hydrants, along narrow highways, alleys, etc., can be easily laid out so that practically every job becomes a machine trenching job, with attendant speed and economy.

The Baby Digger weighs approximately 4 tons. This feature, coupled with its extremely narrow width and low height, permits its use over lawns, soft spots, sidewalks, driveways, etc., and at the same time affords unrivalled mobility from job to job on its own specially-built trailer. Mounted on dual wheels with pneumatic tires it moves at truck-speed through traffic, violating no highway regulations; while overhead viaducts, trolley wires and trees provide no obstacle.

A wide range of digging speeds and cutting widths, plus an astonishingly fine and rugged construction, guarantee unsurpassed performance. A significant fact is its preference in localities where unusually difficult digging conditions exist.

Learn what real machine trenching performance can be. Use the Baby Digger on your next job—it is fitted to your work. Write for specifications.

THE CLEVELAND TRENCHER COMPANY
"Pioneers of the Small Trencher"
20100 St. Clair Ave., Cleveland, Ohio.

The CLEVELAND BABY DIGGER

Telemco System

(Continued from page 72)

peres at 35 volts, is so small that it is not objected to by any telephone or telegraph companies from whom lines might be leased.

Power is required only at the receiving end, which is a great advantage in cases where it is desirable to install the transmitter in manholes or other places where a current source is not available.

It is impossible for sparks to occur at the transmitter since there are no brushes or contacts, and there is practically no limit to the distance over which the system may be used.

The device, when properly adjusted, is accurate to within at least 2% of its reading.

The device consists of only a vacuum tube, a milliameter, a fixed resistance, a variable inductance and a static voltage regulator. The system maintains its accuracy to within 2% even if the supply voltage drops to 20% below normal, or rises 15% above normal.

Gas companies have numerous applications for the Telemco Systems in the measurement of pressures maintained at outlying points of their distribution systems, namely at holders, reduction points, pipe line entrances to large industrial plants, pressures along long distance transmission lines, also for the measurement of heights of holders, indications of positions of valves, etc.

Central Heating Plants for the remote recording of steam pressures maintained at distant points in the system.

New Humphrey Ambassador Heater

The General Gas Light Co., Kalamazoo, Mich., announce the New Humphrey Ambassador Heater for homes, offices and stores.

The new Ambassador is a refinement of the Humphrey gas unit heating principle of fan-forced circulation and combustion. All the Unit Heater features of quick, clean, safe, economical heat have been retained but the mechanism—radiating elements, motor, fan, gas lines—have been concealed in a cabinet of artistic design that blends with the best of home or office furnishings.

Temperature is maintained in the space to be heated within a few degrees by an automatic electrically operated thermostat located near the room air intake grill. It is equipped with safety pilot valve, which in case pilot is extinguished, automatically cuts off gas to burner as well as to pilot. All sides and top of the cabinet are constructed of heavy gauge sheet steel and shielded so that even children can touch any portion of the cabinet without fear or danger of burns.

In warm climates it can be used alone for heating homes, offices, and stores. In colder climates it will be a valuable aid to the central heating plant, saving many hours of costly operation in Fall and Spring when just enough heat to take off the chill is required.

For offices, stores, and shops the cleanliness of gas heat, the economy of using heat only when it is needed, are expected to arouse interest among office tenants, and store and shop owners, especially since the artistic design of the Ambassador permits its use in any surroundings. Descriptive literature will be mailed on request.

Humphrey Ambassador Heater

New Specific Gravity Indicator and Recorder

The Permutit Company, 440 Fourth Avenue, New York City, has placed on the market a new model of its Ranarex Specific Gravity Indicator and Recorder. The well established Ranarex principle, has been retained, but the design has been simplified.

All working parts are easily accessible. The entire indicating and recording mechanism is attached to one plate, and the driving mechanism, including the motor, to another. Both plates may be removed without the use of tools, by loosening a few wing screws; their removal opens all gas passages over their entire length.

In most instances the time lag will be about half a minute.

The standard 9-inch scale and circular chart 8 inches in diameter are graduated

from 0.2 to 1.0 (air = 1), and accuracy within 0.015 is guaranteed.

A special Ranarex recorder for the control of butane-air mixing has been developed. This machine has a specific gravity range from 1.0 to 1.2 with a superimposed adjustable scale graduated in B.t.u. per cu. ft.

The Permutit Company states it is prepared to furnish Ranarex machines with any desired scale range for special applications where the specific gravity of a gas mixture is a guide to efficient and satisfactory operation.

Toncan Iron Tin Plate

Republic Steel Corporation, Youngstown, Ohio, is announcing a new product which has been developed by Republic research workers—Toncan Iron Tin Plate.

Possessing the same base analysis as Toncan Copper Molybdenum Iron, Toncan Iron Tin Plate is endowed with the rust and corrosion-resistance characteristic of Toncan Iron. This enables it to be used in many cases where ordinary tin plate would fail.

A few of its uses are: Containers for Chemicals, Gas Meters, Lithographing Plates for Signs, Furnace Heat Pipes, Sound-proof Ceilings, Stove Backs, Drip Pans, Lye Cans and various architectural applications—gutters, flashing, etc.

"That McWANE PIPE will CUT wonderfully"

~~~and it did!

A clean-cut pipe that cuts cleanly! That's McWANE. It is one of the good old-fashioned qualities that McWane casting processes (in green sand) retain when they produce cast iron gas pipe that is strictly *sand-cast.*

Straightness and uniformity, smoothness of walls, bells, and spigots, are of paramount importance in making cast iron gas pipe. In McWane gas pipe they are outstanding features.

In addition, McWane gas pipe has *strength*—30,000 lbs. average tensile; 2,600 lbs. average transverse. It is modern in its weights, yet old-fashioned in the ease and sureness with which it can be cut and tapped, as shown above.

Sizes, 1¼ through 12 inches. Standard lengths. Fittings.

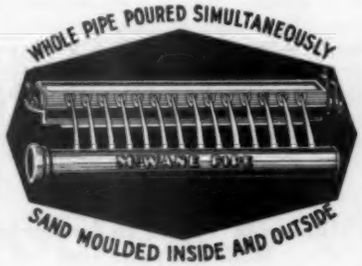
VARIOUS TYPES

McWane gas pipe is adapted to various types of trench-made jointing, being furnished plain ends, Bell and spigot, threaded, or cast for special forms of joints.

McWANE HIGH-PRESSURE GAS JOINTS

McWane recess-threaded (without couplings) and Flexpan expansion joints enable gas companies to use rust-resisting cast iron pipe and gain high-pressure joints that are sure, simple, and economical. Write for McWane Gas Joints folder.

McWANE CAST IRON PIPE CO. BIRMINGHAM ALABAMA



PACIFIC STATES CAST IRON PIPE CO. PROVO, UTAH

208 S. La Salle Street, CHICAGO
149 W. 2nd South Street, SALT LAKE CITY
1807 Santa Fe Bldg., DALLAS
111 Sutter Street, SAN FRANCISCO
417 S. Hill Street, LOS ANGELES
238 Continental Oil Bldg., DENVER
1006 Grand Avenue, KANSAS CITY
611 Spalding Bldg., PORTLAND, ORE.
40 Exchange Place, NEW YORK

NEWS of the GAS INDUSTRY

420 Miles of Line Under Construction in Five States

Construction work on Northern Natural Gas pipe lines continues at a rapid rate of speed.

Construction crews are now at work on 420 miles of main and branch lines in Kansas, Nebraska, Iowa, Minnesota and South Dakota.

The 16-inch line from Mason City to Owattona, Minnesota, which is now under construction, has crossed the Iowa-Minnesota state line. Twenty-eight miles of this 65-mile line to serve southern Minnesota has been built already. The eighty-six miles of fourteen-inch line is under construction to Sioux Falls. On the 183-mile twenty-six-inch line to Mullinsville from Clifton, Kansas, 52 miles remains to be completed.

Sixty-six miles of branch line is being constructed in Nebraska to Wayne, Wakefield, Emerson, Adams, Wymore, Blue Springs, Elkhorn, Valley and Waterloo.

Twenty miles of branch line in Iowa is being constructed to bring service to Glenwood. Exira, Audubon, Dayton, Pilot Mound and Boxholm.

Large Natural Gas Installation in Steam Plant

What is believed to be the largest natural gas installation in the Southeast has just been completed by the Atlanta Gas Light Company for the Georgia Power Company, at Atlanta.

This is the installation of natural gas to fire the boilers at Plant Atkinson, the 100,000 horse-power steam plant of the company, on the Chattahoochee River, ten miles from the city. These boilers will use, when in operation, between 20,000,000 and 24,000,000 cubic feet of natural gas a day.

The gas will be purchased by the power company on a "dump load" basis, with the provision that the amount of gas can be cut down or turned off altogether at any time, if the gas is needed for Atlanta or its vicinity, and this means that the plant must retain its facilities for coal operation.

The plant, however, was designed to burn either powdered coal or natural gas, only minor changes being necessary to change for either form of operation.

Approve Construction of Gas Plant

The New York Public Service Commission has approved the construction of a gas plant in Walden, Orange County, New York, by the Wallkill Valley Gas Corporation, under the terms of a local franchise granted to Alexander R. Whittaker and Robert T. Livingston. The Commission consented to the transfer of this franchise to the Wallkill Company. Approval has also been given to the issuance by the company of $107,600 in common stock of which $103,538 is to be used for organization, purchase of land, new construction and equipment. According to evidence presented at the hearing, it is proposed to spend $44,000 in building the transmission system and $67,840 in equipment.

Gas Well Ruling Made

The Texas Railroad Commission, under which operation of oil and gas wells is controlled, has set down rules designed to prevent the waste of natural gas in the drilling and operation of gas wells, especially in the Panhandle field.

It has been provided that no operator shall take longer than three days in which to drill and complete a gas well unless a miller head or other satisfactory equipment is used to prevent waste of gas during the drilling process. The commission has reserved the right to make exceptions to the rule when facts justifying such exception have been properly presented to the commission.

Casing in all wells must be set and cemented not more than 25 feet above the point where the first show of gas is encountered in the lime formation, when said wells are to be produced from said formation. When wells are to be completed as oil wells at a depth below the lime gas one string of casing must be set and cemented with sufficient cement to completely and effectually seal off the lime gas formation from the other formations and all casing must be cemented by the pump and plug method.

The commission has also issued formal orders fixing the Van oil field allowable at 50,000 barrels daily.

Extension of Gas Pipe Line Authorized

The Public Service Company of New Hampshire were recently authorized to extend a gas pipe line from the Laconia city line, which city it now serves, to the Franklin City line, which city it now serves, and to operate as a public gas utility in the towns of Belmont, Sanbornton, Tilton and Northfield.

Minnesota Towns to be Served With Propane Gas

Franchises have been granted to the Detroit Lakes Gas Company, Detroit Lakes, Minnesota, a subsidiary of the Municipalities Gas Corporation by the following towns; Dent, Park Rapids, Rothsay, Lake Park, Hawley, Hitterday and Perham, Minnesota. Installations are now being made and these towns will be served by the Detroit Lakes Gas Company with propane gas delivered by truck.

Convention Calendar

November

16-17 Second Southwest Regional Gas Sales Conference, Hotel Arlington, Hot Springs, Arkansas.

16-21 Third Annual Conference on Bituminous Coal, Pittsburgh, Pa.

December

8-11 Eleventh Annual Gas Meter Short Course and Conference, Iowa State College, Ames, Iowa.

10-11 Seventh Annual Conference on Welding, Engineering Extension Department, Purdue University, Lafayette, Indiana. W. A. Knapp, Professor in Charge, Engineering Extension Department.

Norborne, Mo., Soon to Have Natural Gas

The pipe line department of the Cities Service Gas Company are laying nine miles of main line to Norborne, Mo.

The distribution system in Norborne was laid by the Ozark Distributing Company a few months ago. As soon as the main line is completed the town will be ready to burn its first natural gas.

Norborne is located approximately ten miles west of Carrollton and will be operated by the Ozark Distributing Company with headquarters at Carrollton. L. M. King is manager of this company.

Extend Gas Mains

The Pacific Gas and Electric Company has begun construction of seven miles of 26-inch high-pressure main extending from its Portrero gas plant, in San Francisco, to the San Mateo County line. This main will be hooked up with the pipe line that brings Kettleman gas into San Francisco. Later it will become a unit of a second feeder line which the company plans to build into the city from Milpitas. The second feeder pipe line will cost approximately $2,000,000.

Geologists Organize

Approximately fifty geologists working among the oil and gas companies in East Texas, met at Tyler recently and organized the East Texas Geological Society. Officers were elected as follows: A. E. Wendtland of the Humble company, president; Wallace C. Thompson of the Sun company, vice-president; and Elmer Rice of the Pure Oil company, secretary-treasurer.

The executive committee is made up of the three officers and A. C. Wright of the Shell company and Henry Clark of the Sinclair company.

(News continued on page 78)

Have You Received
Your Copy of
Our New No. 16 Catalog?

SPRAGUE METERS

and

Sprague Regulators

Accurate Pilot Measurement
Accurate Volume Measurement

Satisfactory
Maintenance cost, first cost, and general results in Manufactured or Natural Gases, High or Low Pressure

SPRAGUE METER CO.
BRIDGEPORT, CONN.

Purdue Gas Heating Course A Success

THE Purdue University extension course in gas heating, conducted in Hammond, Indiana, on September 17 and 18 and in South Bend, Indiana, on September 22 and 23, met with an enthusiastic response from a large number of northern Indiana heating contractors. The registration at each course was well above a hundred and included, besides the contractors, representatives of leading gas home-heating equipment manufacturers and utility company representatives.

The course was in charge of R. B. Leckie, professor of gas engineering at Purdue, and one of the country's outstanding authorities on gas utilization.

The gas heating course was accompanied, both in Hammond and South Bend, by an extensive exhibit of gas home-heating equipment. The Northern Indiana Public Service company in each instance cleared its sales floor of most of their merchandise and turned over the entire space to the manufacturers whose home-heating equipment has been approved for sale in accordance with the co-operative sales plan issued by the company on April 1, 1931. Seven furnace manufacturers, four boiler manufacturers, one gasteam radiator manufacturer and three conversion burner manufacturers were represented.

The course in each city was opened by Stanley Jenks, merchandise sales manager of the Northern Indiana Public Service company, who spoke on "The Market and Opportunities It Presents." Mr. Jenks discussed the field of home-heating as it exists at present and outlined the advantages of gas home-heating and its excellent prospects for the future.

A. C. Grant, of the Minneapolis-Honeywell Regulator company, also appeared on each program, discussing "Control Equipment."

At school in South Bend. R. B. Leckie, Professor of Gas Engineering, Purdue University, who conducted the course, is behind the desk on the extreme right.

Professor Leckie appeared three times on each of the two programs. He introduced the technical side of gas heating by discussing gaseous fuels, their kinds, utilization, heating values, combustion problems and the like. He later went on to a consideration of gas-designed equipment, conversion burners, draft diverters and American Gas Association codes and finished with a review of installation problems, covering size of unit required, the manner of estimating heat losses from buildings and the thermal efficiency of gas heating plants.

One of the high points of each of the courses was the address "Co-operation in the Heating Field," given by Morse DellPlain, president of the Northern Indiana Public Service company.

A plan of merchandising gas heating appliances which must include the dealer, the manufacturer and the utility and through which each will receive the maximum profit, without penalizing the consumer, was shown by Mr. DellPlain to be a pressing need in the heating industry.

The gas heating course was finished off in both Hammond and South Bend by a golf tournament conducted by the Northern Indiana Public Service company.

Personals

C. W. Martin has been appointed Assistant Resident Manager of the Amsterdam district of the New York Power & Light Corporation. Mr. Martin was formerly industrial power and gas specialist at Hudson, N. Y.

George J. Burkhart has been appointed industrial engineer of the Oklahoma Natural Gas Corporation, Tulsa, Okla.

C. R. Smith succeeds T. Lowrance as manager of the Southwest Gas Company's Cuero, Texas, office. Mr. Smith was formerly located at Gonzales, Texas.

R. J. Martin was recently appointed Heating and Industrial Engineer of the Central Power Company, Hastings, Nebraska. Mr. Martin was formerly connected with the Iowa-Nebraska Light & Power Company.

L. W. Byron has been appointed district commercial manager of the Wisconsin Power & Light Company, Fond du Lac, succeeding T. W. Yelle, who has accepted a similar position at Sheboygan.

Roy Gearhart has recently been appointed pipe line superintendent of the Kansas Pipe Line & Gas Company, McPherson, Kansas. Mr. Gearhart succeeds Mr. Ray Reagle who has been transferred to the construction department.

Carrol Boston has been appointed local superintendent of the newly established Mount Morris office of the Illinois Heating and Industrial Engineer of the Northern Utilities Company. Gas service was recently extended to Mount Morris.

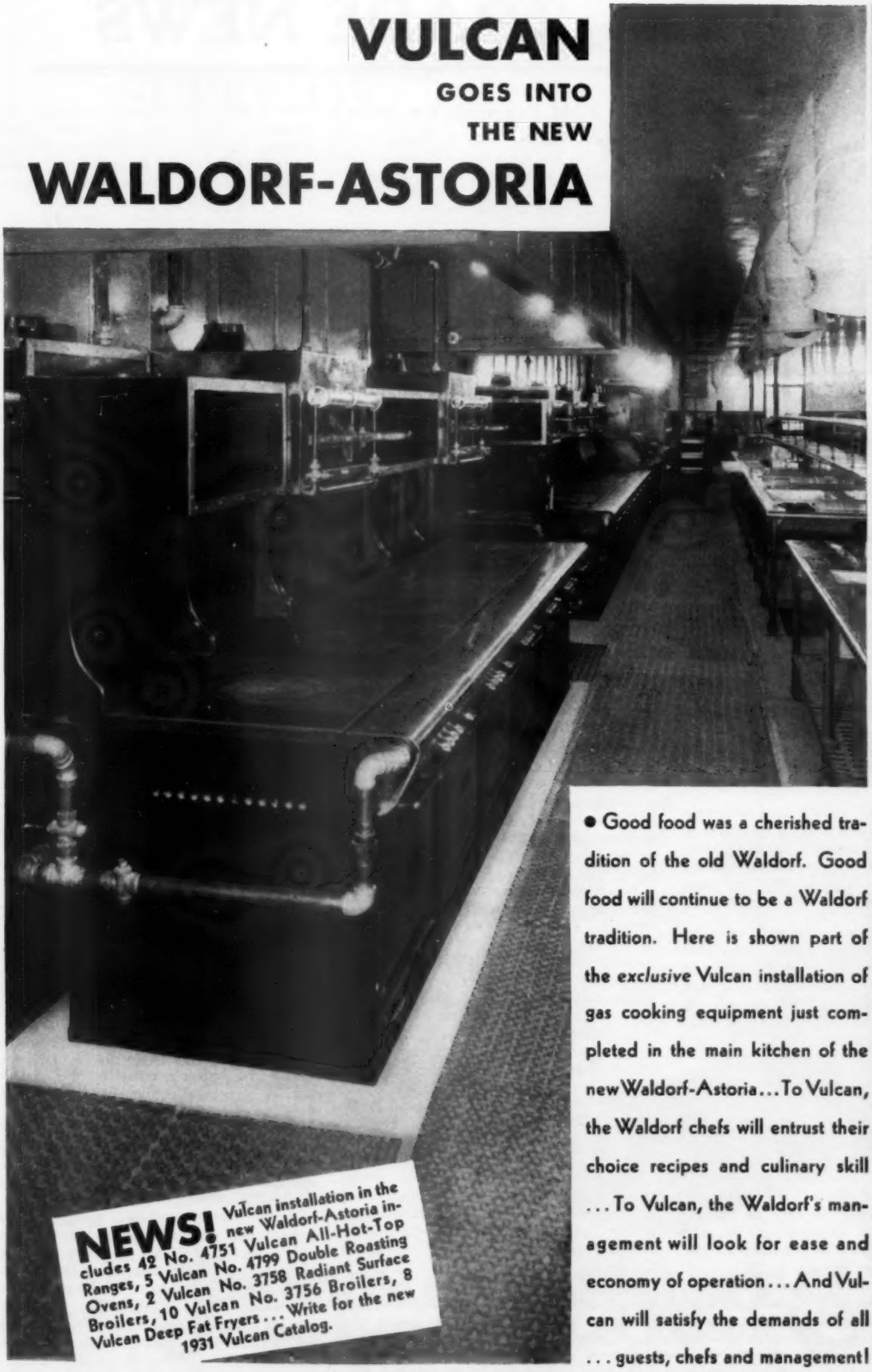
C. H. Dinsmore, formerly district manager at Tomah, was recently transferred to the Public Relations Department of the Wisconsin Power & Light Co., Madison. Mr. Dinsmore will be in charge of the employees educational activities.

Henry W. Hennig was recently appointed Bergen Division agent of the Public Service Electric & Gas Company, with headquarters at Hackensack, N. J. Mr. Hennig has been associated with the Public Service Company since 1903.

A. W. Conover has been appointed general manager of the Oklahoma and Kansas properties of the Empire Public Service Co., the Caney Electric Co., the Southwest Pipe Line Company and the Southwest Production Company.

(Personals continued on page 80)

VULCAN
GOES INTO THE NEW
WALDORF-ASTORIA



NEWS! Vulcan installation in the new Waldorf-Astoria includes 42 No. 4751 Vulcan All-Hot-Top Ranges, 5 Vulcan No. 4799 Double Roasting Ovens, 2 Vulcan No. 3758 Radiant Surface Broilers, 10 Vulcan No. 3756 Broilers, 8 Vulcan Deep Fat Fryers... Write for the new 1931 Vulcan Catalog.

● Good food was a cherished tradition of the old Waldorf. Good food will continue to be a Waldorf tradition. Here is shown part of the *exclusive* Vulcan installation of gas cooking equipment just completed in the main kitchen of the new Waldorf-Astoria... To Vulcan, the Waldorf chefs will entrust their choice recipes and culinary skill ... To Vulcan, the Waldorf's management will look for ease and economy of operation... And Vulcan will satisfy the demands of all ... guests, chefs and management!

VULCAN GAS EQUIPMENT...

HEAVY-DUTY GAS COOKING APPLIANCES FOR EVERY REQUIREMENT OF HOTELS, RESTAURANTS, CLUBS, HOSPITALS, SCHOOLS AND OTHER INSTITUTIONS

STANDARD GAS EQUIPMENT CORP., 18 EAST 41ST STREET, NEW YORK CITY

NEW YORK • BALTIMORE • CHICAGO • BOSTON • BIRMINGHAM • Pacific Coast Distributor: Northwest Gas & Elec. Equipment Corp., Portland, Oregon

TRADE NEWS

D. F. Kahn

D. F. Kahn was elected Chairman of the Manufacturers' Section of the American Gas Association, at the recent meeting in Atlantic City.

Edwin M. Chance has been elected to succeed Mr. Dwight P. Robinson as president of United Engineers and Constructors, Inc.

Mr. Robinson, having completed the work of co-ordinating the activities of The U. G. I. Contracting Company, Day and Zimmermann Engineering and Construction Company, Public Service Production Company, and Dwight P. Robinson & Company, Inc., has resigned as president. The company will continue to have the benefit of his services in a consulting capacity.

Mr. Chance had been a vice president of United Engineers & Constructors, Inc., since its formation in January, 1928. Born in Philadelphia, he was graduated from Delancey School in 1903 and from the University of Pennsylvania in 1907.

During the following two years he worked in Nevada in metal mines and then until 1913 was chemist in charge of coal preparation, mine fire fighting and rescue work for the Philadelphia & Reading Coal & Iron Company at Pottsville, Pa.

In 1912 Mr. Chance was awarded the Edward Longstreth medal by The Franklin Institute for work on mine gases.

From 1913 to 1917 he was consulting chemist and engineer for anthracite and bituminous coal mining companies in Pennsylvania and West Virginia.

Entering the army in 1917 as captain in the Ordnance Department he advanced to the rank of Colonel in the Chemical Warfare Service in 1919.

In 1919 he joined the Day & Zimmermann, organization in charge of all engineering and construction work for a wide variety of plants and properties. In 1928 he was elected president of Day & Zimmermann Engineering & Construction Company.

Gas Field Extended Ten Miles

Hudson Valley Fuel Corporation of New York, has awarded contract to furnish, deliver and install 11,600 feet of 3" welded steel main, 31,900 feet of 2" welded steel main and 16,000 feet of 1¼" welded steel main exclusive of pipe coating or repaving, 560 ¾" services from main to house and 500 governor and meter connections in the town of Walden, N. Y.

Central States Gas Company of Vincennes, Ind., has awarded contract to furnish, deliver and install 2300 feet of 8" welded steel main from gas plant to 3rd and Busseron St., Vincennes, Ind., also overhaul 700 feet of 6" main. Construct 5 concrete governor pits and install 5 governors.

Washington Gas & Coke Company, Washington, Ind., has awarded contract to furnish, deliver and install 3850 feet of 2" welded steel main, 1100 feet of 4" welded steel main and 150 feet of 3" welded steel main in Washington, Indiana, for distribution system and 3 governor pits.

Princeton Utilities Company of Princeton, Indiana, has awarded contract to furnish, deliver and install 14,000 feet of 2" welded steel main for distribution system and 12 governor pits.

International-Stacey Corporation Buys Stacey Manufacturing Company

International-Stacey Corporation with headquarters at Columbus, Ohio, announces the purchase of all the stock of the Stacey Manufacturing Company of Cincinnati, Ohio.

The Stacey Manufacturing Company together with the Stacey Brothers Gas Construction Company which was recently purchased by International-Stacey Corporation, is one of the oldest and largest companies in the country devoted to the design and fabrication of gasholders and other high pressure tankage. The operation of these two businesses in Cincinnati under the direction of the International-Stacey Corporation will constitute one of the major industries of that city.

Col. Carmi Thompson, President, A. A. Ranshaw, Vice-President, H. M. Runkle, Secretary and Treasurer and E. J. Baechle, Assistant Secretary and Treasurer, will head the Cincinnati group, which will be known as the Stacey Gas Construction Division of International-Stacey Corporation. Management will be directed from the executive offices in Columbus.

The purchase of the Stacey Manufacturing Company ends a controversy which has been going on for many years and closes the matter satisfactorily to both sides.

It will be recalled that a short time ago the International Derrick and Equipment Company of Columbus entered into a reorganization with the Stacey Engineering Company, the new organization being known as the International Stacey Corporation. This reorganization included the P. H. & F. M. Roots Company and the Connersville Blower Company, Inc., of Connersville, Indiana, the Wilbraham-Green Blower Company, Pottstown, Pa.,

Col. Carmi Thompson and H. M. Runkle

including the Hayton line of Centrifugal pumps and blowers, and the Stacey Brothers Gas Construction Company of Cincinnati. The entrance of the Stacey Manufacturing Company into the organization completes the properties of the International-Stacey Corporation which at its plants in Columbus and Marietta, Ohio, Beaumont, Texas and Torrence, California, manufactures a full line of machinery for the development and production of oil, gas and artesian well products.

The Stacey Gas Construction Division also manufactures a complete line of galvanized structural equipment for railroads, aviation and other industries.

The Roots-Connersville-Wilbraham Division of International-Stacey Corporation located at Connersville, Indiana, manufacturers a complete line of rotary positive blowers, gas pumps, boosters, exhausters, meters, cycloidal pumps, liquid pumps and vacuum pumps for use in every known field of industry. In its Hayton centrifugal department the Roots-Connersville-Wilbraham Division of International-Stacey Corporation manufactures a complete line of centrifugal pumps and blowers for all applications for which contrifugal units may be employed.

(Trade News continued on page 82)

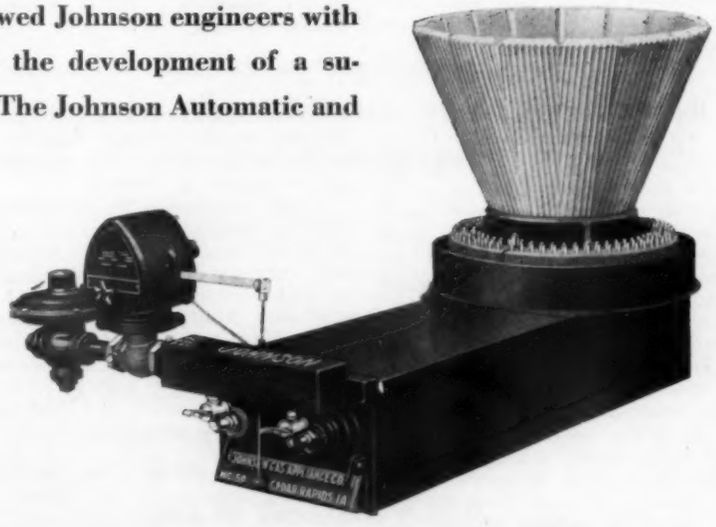
SUPERIOR

Gas Meters
Provers
Service Cleaners
Diaphragms
Repairs

SUPERIOR METER CO.
167-41st Street
Brooklyn, N. Y.

JOHNSON SUPERIORITY

Twenty-three years experience in the manufacture of quality gas appliances has endowed Johnson engineers with the background necessary for the development of a superior gas home heating unit. The Johnson Automatic and Johnson Junior lines have confirmed this theory. In one season these two lines of burners have gone from scratch to an enviable position of dominance. Get acquainted with the Johnson line—write for full information.



JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA
JOHNSON MATCHED DIRECT JET

Eastern Representative: R. M. Henshaw & Co., 250 Stuart St., Boston, Mass.

Electrolux Display at the Recent A. G. A. Convention "Brings Down the House"

This display, occupying as it did the full width and depth of Atlantic City Auditorium's gargantuan stage, was a commanding and awe-compelling sight. Built in the manner of a Grecian temple, its design was inspired by the Altar of Zeus at Pergamon, the original of which is now in the Berlin Museum.

Its classic design was developed along thoroughly modern lines, of modern materials. It had twenty-two columns and pilasters, 14 feet high, of Allegheny Metal. They had been fabricated in special moulds solely for this booth. These columns supported a great entablature of black and silver lacquer, upon which stood cut-out letters each four feet high, stretching out to 52 feet in width to spell the magic word "ELECTROLUX." Beneath it were smaller entablitures bearing the words "The Gas Refrigerator," and "Freezes by Heat," prominently in blue.

The whole structure rested on a base of black lacquered wood, raised six steps above a terrace. The terrace itself, 85 feet by 50 feet, was enclosed by an ornamental hedge and paved with natural pebbles. Set into the terrace stood an illuminated ornamental fountain which showered its spray upon Bermudian fan-coral in an ever-changing panorama of colors. The surrounding pebbles, arranged in an ornamental design, were hand-dyed black.

Groups of colorful garden chairs and parasol-tables invited guests to be seated. Uniformed maids served guests with ice cream that had been kept at just the proper consistency in Electrolux Ice Cream Cabinets.

Bottled Gas Men Form Organization

A representative group of bottled gas producers, distributors and dealers met at Atlantic City on October 14th and formed the nucleus of what is shortly to become an organization, national in scope, devoted to the interests of the bottled gas industry.

The first meeting was held at noon at the Shelburn Hotel. Mr. Mark Anton of the Suburban Gas Company, Belleville, N. J., was elected chairman, and under his able leadership rapid progress was made. At an evening session on the same date, all the preliminaries were completed and the meeting adjourned until the middle of January, at which time the first regular quarterly business meeting will be held in New York City.

At the January meeting by-laws will be adopted, incorporation papers filed, a permanent headquarters selected and regular activities entered upon.

The main objects of this new organization are to adopt a code of ethics designed to promote a higher standard of merchandising methods and to provide an adequate medium through which the individual members may work for the good of the industry as a whole.

As the organization develops, all of the activities undertaken by similar associations will be entered into. Advertising, sales, delivery and service problems will be made the subject of study and open discussion, while special committees will be appointed to investigate and report on problems of a more intricate nature.

Membership will be open to bottled gas producers, distributors and dealers, and Associate Membership to appliance and equipment manufacturers.

Mr. Richard F. Ely, Island Home Commodities, Hicksville, L. I., is Secretary of the newly formed National Bottled Gas Association.

The Legal Side of Our Industry

(Continued from page 70)

For illustration, in United Natural Gas Products Corporation V United Carbon Co., 131 So. 52, it was disclosed that two Delaware corporations, one being a gas company, had established their principal place of business in Louisiana. A contract was executed in New York by which the gas company agreed to sell certain property including gas pipe lines to the other corporation. The latter refused to pay for the property and the gas company filed suit in Louisiana to recover $60,000. It was contended that under these circumstances the gas company could not lawfully file suit in Louisiana. However, the Court held the courts in the latter state the proper jurisdiction, saying:

"Our opinion is that the liability of the defendant, for any unpaid part of the price of the property in Louisiana, bought by the defendant from the plaintiff (gas company) in New York, if any such liability remains unpaid and if the plaintiff therefore has a cause of action anywhere, is a liability connected with the business done by the defendant in this state."

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, of American Gas Journal, published monthly at East Stroudsburg, Pa., for October, 1931.

State of New York }
County of New York } ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared S. G. Krake, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the American Gas Journal and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, American Gas Journal, Inc., 53 Park Place, New York City; Editor, H. M. Riley, Douglaston, L. I., N. Y.; Managing Editor, none; Business Manager, S. G. Krake, Jamaica, L. I., N. Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) S. G. Krake, Jamaica, L. I., N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails, or otherwise, to paid subscribers during the six months preceding the date shown above is ——. (This information is required from daily publications only.)

S. G. KRAKE,
Business Manager.

Sworn to and subscribed before me this 6th day of October, 1931.

(Seal) ROZELLA BENNETT.
(My commission expires March 30, 1933.)

Why the KOMPAK Copper Tank *is Guaranteed* For Twenty Years

THE MARVELOUS
KOMPAK
WITH THE COPPER
TANK GUARANTEED
FOR TWENTY YEARS.

We know that if the purchaser of an automatic heater can be shown the difference between a galvanized steel tank and a Copper Kompak, he will gladly pay the small additional $2.00 or $3.00 a month. In many localities steel tanks last only two or three years, and rarely (except with lime water) can they be depended upon to last over five or six years.

We know that Kompak Copper Tanks will last a life time, with *clean* hot water. We know because we build these tanks in our own shops, and no finer tanks can be built. We know that they will never wear out and we are willing to back this certain knowledge with a guarantee that no purchaser will have to invest one penny for a new tank, (the heart of an automatic water heater) for twenty years.

KOMPAK
TRADE MARK REG.

THE KOMPAK CO.
Automatic Thermostatic Gas Water Heaters
NEW BRUNSWICK
NEW JERSEY

SC RATED FURNACES

BUILT TO DELIVER DEFINITE OPERATING RESULTS

Low fuel consumption—accurate furnace atmosphere control—absolute heating dependability—definite operating and production results. These features are what your industrial prospects are seeking in heat treating equipment. SC Rated Furnaces have these features—and more! The cyanide pot hardening unit below is installed in the Rollaway Bearing Co. plant at Syracuse, New York. It is used for hardening roller bearing stock—an exacting process. It is only one of several Rated furnaces of various types purchased by Rollaway—all giving more than satisfactory results. Other SC Rated Furnaces are also furnished as follows: small oven, forging, rivet heating, and oil tempering.

SC Surface Combustion

SURFACE COMBUSTION CORPORATION
TOLEDO, OHIO,

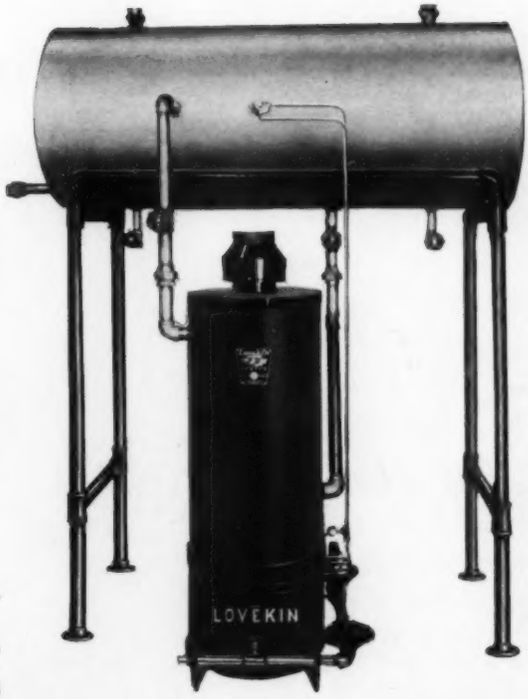
SALES AND ENGINEERING SERVICE
IN PRINCIPAL CITIES

The NEW LOVEKIN

Multi-Tube Storage Systems

THOSE who from personal or business experience *know* Lovekin, will welcome with open arms this addition to the family. A new, larger field is opened up . . . a field where buyers will be even more eager to effect savings through Lovekin efficiency than in the market of smaller homes.

The principle of heat transfer developed, perfected and used in the Lovekin since the very beginning, places this new "multi-tube" well along the road to a successful career.



A volume water heater for industrial and commercial institutions (and large homes) that embodies the same successful and exclusive principle of multiple tubular construction used in the domestic size Lovekin.

Heaters and Storage tanks are furnished in many different combinations and either in Everdur-Copper or Galvanized Steel.

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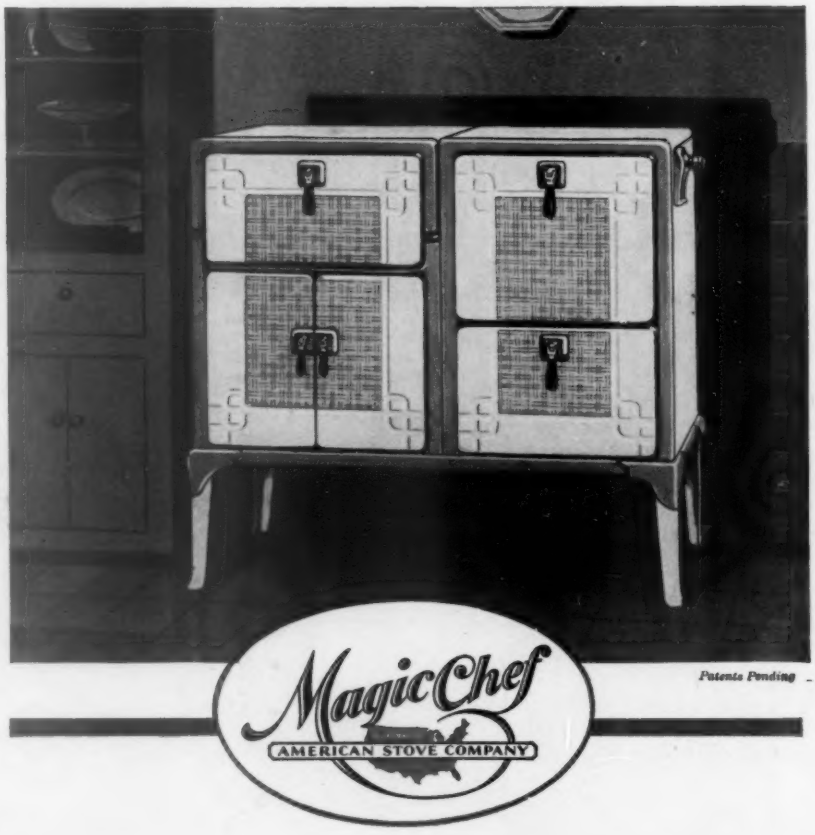
THE LOVEKIN WATER HEATER COMPANY

NEW YORK PHILADELPHIA CHICAGO

The NEWEST MAGIC CHEF

SERIES 600



Patents Pending

In price and type of gas range, the Series 600 Magic Chef bridges the gap between the top of the line and the popular-priced Series 500.

This newest Magic Chef is extremely handsome and imposing in design and decoration. Its color scheme of Old Ivory with two tones of green for trim and panels of Cocoa-Brown basket weave is decidedly pleasing and will harmonize with every kitchen.

With ample cooking capacity for a large family, Magic Chef Series 600 is built for utmost convenience and efficiency.

Special features include the Red Wheel Lorain Oven Heat Regulator, three-in-one non-clogging top burners, Magic Chef top lighter, new type high burner tray, cabinet type cooking top cover which, when closed, conceals the manifold and protects gas valve handles against meddling, roomy service compartment with wide partitioned drawer, patented reversible broiler pan and fully insulated oven and broiler.

With the addition of Magic Chef Series 600, the Magic Chef dealer now has a complete line, nationally advertised, that satisfies every gas range buying requirement and provides every advantage needed to overcome competition.

Look for the RED WHEEL
When You Buy a MAGIC CHEF

AMERICAN STOVE COMPANY

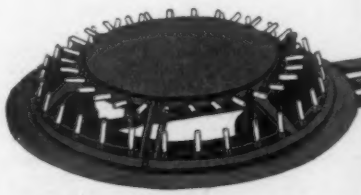
World's Largest Manufacturer of Gas Ranges

NEW YORK . PHILADELPHIA . ATLANTA . CLEVELAND
CHICAGO . ST. LOUIS . LOS ANGELES . SAN FRANCISCO

Transformed by Gas!

Losses *and* Low Profits

Basements are not the only things that Barber Gas Burners transform. They'll transform those low profits and losses into the kind of profits that you want to make. The big swing to AUTOMATIC HEAT is on. Make it pay you!



BARBER
Automatic Jet Gas
BURNERS

THE basement has always been a place of WORK, DIRT and DISORDER to the home owner. Soot, dust, ashes and smoke have occupied it in the winter and left it filthy for the summer.

Not much use trying to keep it clean until Barber Gas Conversion Burners started to take the place of old-fashioned, back-breaking heating methods.

That was over thirteen years ago, and since then tens of thousands of homes have installed economical, carefree GAS HEAT with Barber Gas Burners.

Thousands more will become Barber Gas Burner users this year. Hundreds of them will be right in your community. Are *you* going to make these profits.

No costly replacements of any Furnace or Boiler equipment, and no installation inconvenience with Barber Burners. You can assure your customers of economical and efficient Gas Heating operation for their homes.

Let us tell you how easy it is to demonstrate, sell and install Barber Gas burners. Barber's plan of cooperation with its Dealers is one that insures "tailor-made" installations for every job.

Write today for complete information.

The BARBER GAS BURNER CO.

3702-04 Superior Ave.
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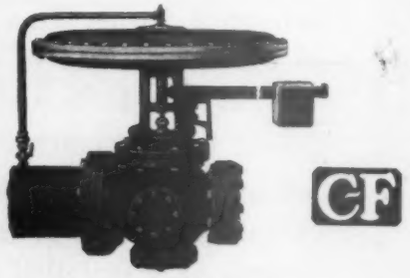
Always

ON THE JOB!



The C-F Automatic Cut-Off

IT automatically closes the ports of the regulator valve. The valves have to be opened by hand before the flow of gas resumes.

No chance for dangerous explosions.

If the diaphragm of the regulator should burst, this cut-off would stop the flow of gas immediately.

More than forty years of experience in controlling gas pressure has taught us how to make this device dependable in its operation.

The Chaplin-Fulton Mfg. Co.

Organized 1884—Oldest Builders of Gas Regulators in the Country. Built in All Sizes, from 1 Inch to 24 Inches; For all Services, 1 oz. up to 2,000 lbs. Pressure to Square Inch.

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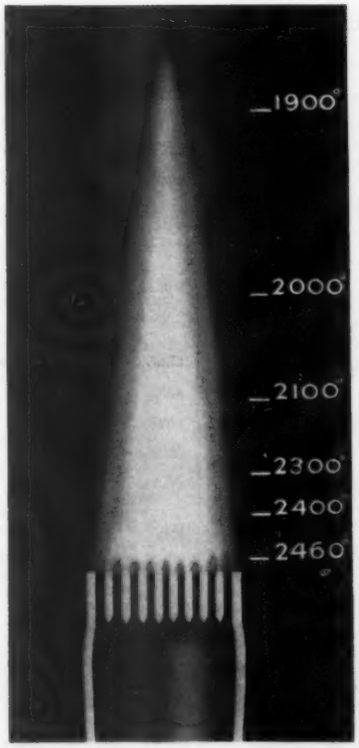
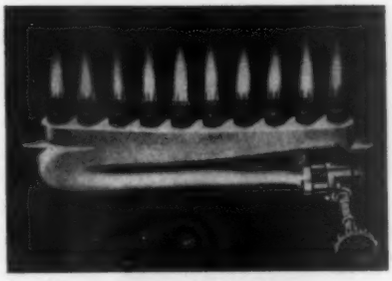
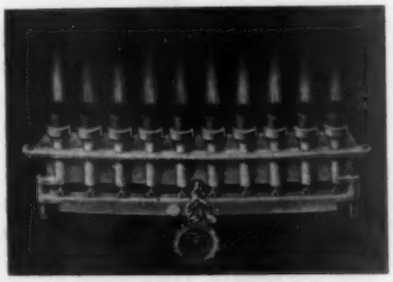
Look



First to the burner



Humphrey Radiantfire Natural Gas Burner



Humphrey Radiantfire Manufactured Gas Burner

Two burners for the two kinds of gas ARE NECESSARY for maximum combustion efficiency. A few other distinctive features include knife edge chromium metal burner tips, brass micro-adjustment hand valve, fish tail gas supply to tips of manufactured gas burner —baffled bunsen tube for natural gas burner, and heavy nickel plate on all burners. You only find Humphrey quality in Humphrey Radiantfires.

No Radiant Heater Can Ever Be Better Than Its Burner

The heart of a radiant heater is its burner. On it alone depends operating efficiency and satisfactory service to your customers. That's why years of painstaking research have been spent in developing the two Humphrey Radiantfire Super Combustion Burners. That's why Humphrey Radiantfires produce the highest flame temperature of all non-pressure burners in the world—averaging 300° to 700° higher than any other in practical use.

3,000,000 satisfied Humphrey Radiantfire users prove that our ideal of quality in burner construction is most desirable in the long run. Measured in heating efficiency, trouble-free service, or dollar for dollar value you serve your customers best by selling Humphrey Radiantfires.

Do you have our latest catalog? Is your stock sufficient to do a real job of selling this season? If not, write or wire today.

HUMPHREY PRODUCT

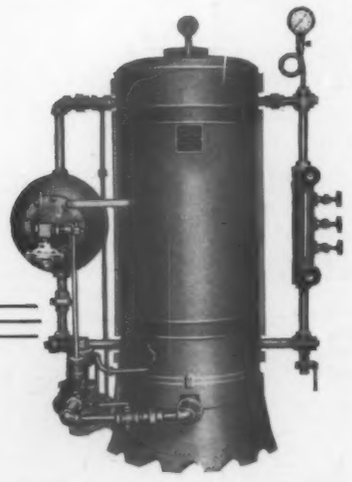
The HUMPHREY Radiantfire

Manufactured by

General Gas Light Company
Kalamazoo, Michigan

44 West Broadway
New York

135 Bluxome Street
San Francisco



"Steam in 4 minutes"

Ofeldt

TRADE MARK

Why most Industries *Use this Independent gas-fired Process Boiler*

Industries using the OFELDT do so primarily because of the boiler's *dependability*, as well as the especially *consistent* results obtained with gas-fired automatic steam . . . Peak loads for power and heating boilers make them at best *unreliable* for process work.

But OFELDT Boilers also eliminate fuel problems and long pipe lines, while their compactness makes installation easy. OFELDT Boilers are readily accessible for that reason, and labor problems are negligible.

Again—and perhaps the most important reason—the OFELDT *steams 4 minutes after lighting*. No delays, obviously, and no idling costs. Your prospects will be interested in seeing these features illustrated in *OFELDT Bulletins*. Write for them.

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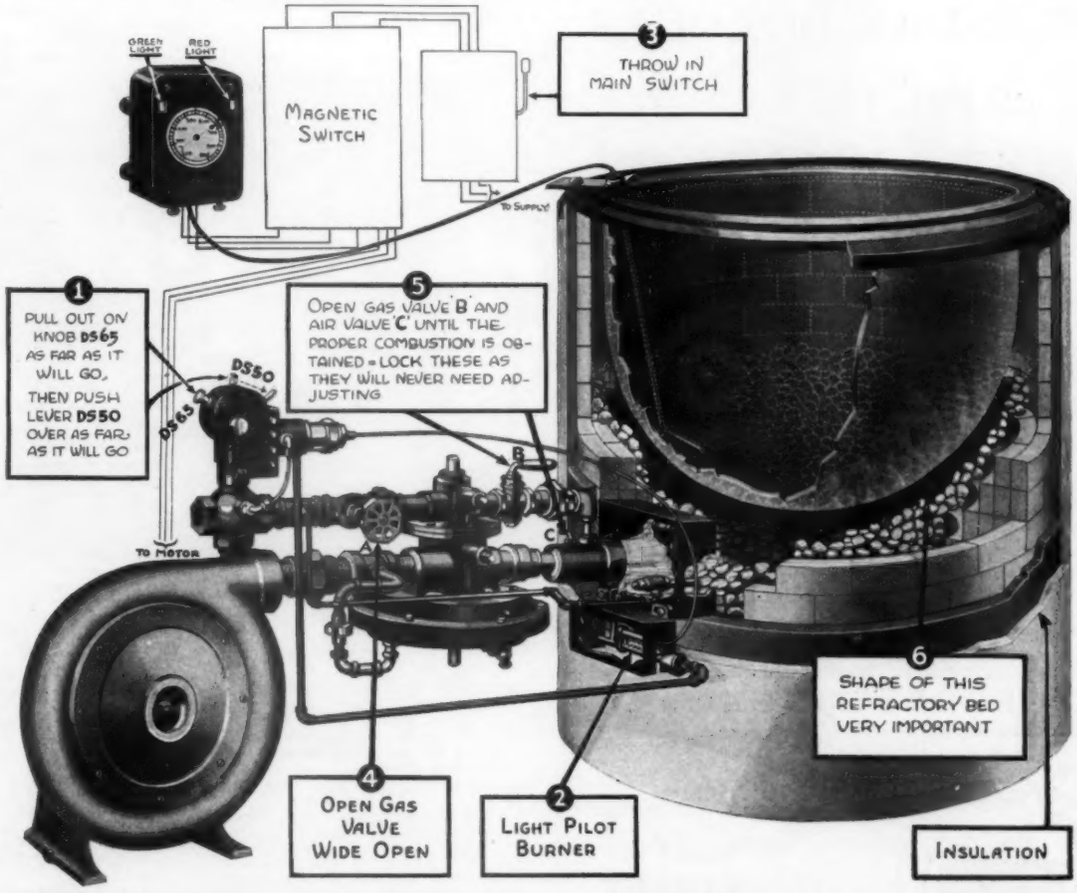
400,000 LBS. in 16 HOURS
OR 25,000 LBS. PER HOUR


GREEN LIGHT
RED LIGHT
MAGNETIC SWITCH
3 THROW IN MAIN SWITCH
TO SUPPLY
1 PULL OUT ON KNOB DS65 AS FAR AS IT WILL GO, THEN PUSH LEVER DS50 OVER AS FAR AS IT WILL GO
DS50
DS65
5 OPEN GAS VALVE 'B' AND AIR VALVE 'C' UNTIL THE PROPER COMBUSTION IS OBTAINED - LOCK THESE AS THEY WILL NEVER NEED ADJUSTING
TO MOTOR
C
6 SHAPE OF THIS REFRACTORY BED VERY IMPORTANT
4 OPEN GAS VALVE WIDE OPEN
2 LIGHT PILOT BURNER
INSULATION

That's the performance of Partlow Automatic Gas Burning Equipment in the Hose Department of one of the large rubber companies. It served a lead melting pot of 20 tons capacity. Speed of melting makes possible this enormous daily capacity in two 8-hour shifts.

Many economies are engineered into Partlow Equipment such as savings of metal, attending labor and gas consumption. All the air that is necessary for complete combustion is entrained as primary air through the burner itself. Flue and stack temperature are also minimized.

In Automatic Gas Burning Equipment you will find a Partlow design of the speed and capacity for practically every size metal melting pot. Partlow Automatic Gas Burning Equipment has the added feature of a Safety Pilot which automatically shuts off all gas in case of any interruption in the gas main or if the pilot should become extinguished. There's one sure way to gain the greatest economy in soft metal melting. Send your inquiries to Partlow.

Write or wire us for list of enthusiastic users.

The Partlow Corporation - New Hartford, N. Y.

McClintic-Marshall

GAS HOLDERS

PRESSURE HOLDERS

RIVETED AND ELECTRIC-WELDED PIPE

STEEL PLATE CONSTRUCTION

McCLINTIC-MARSHALL CORPORATION

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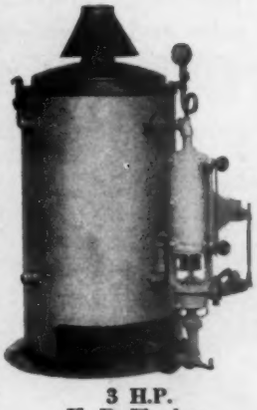

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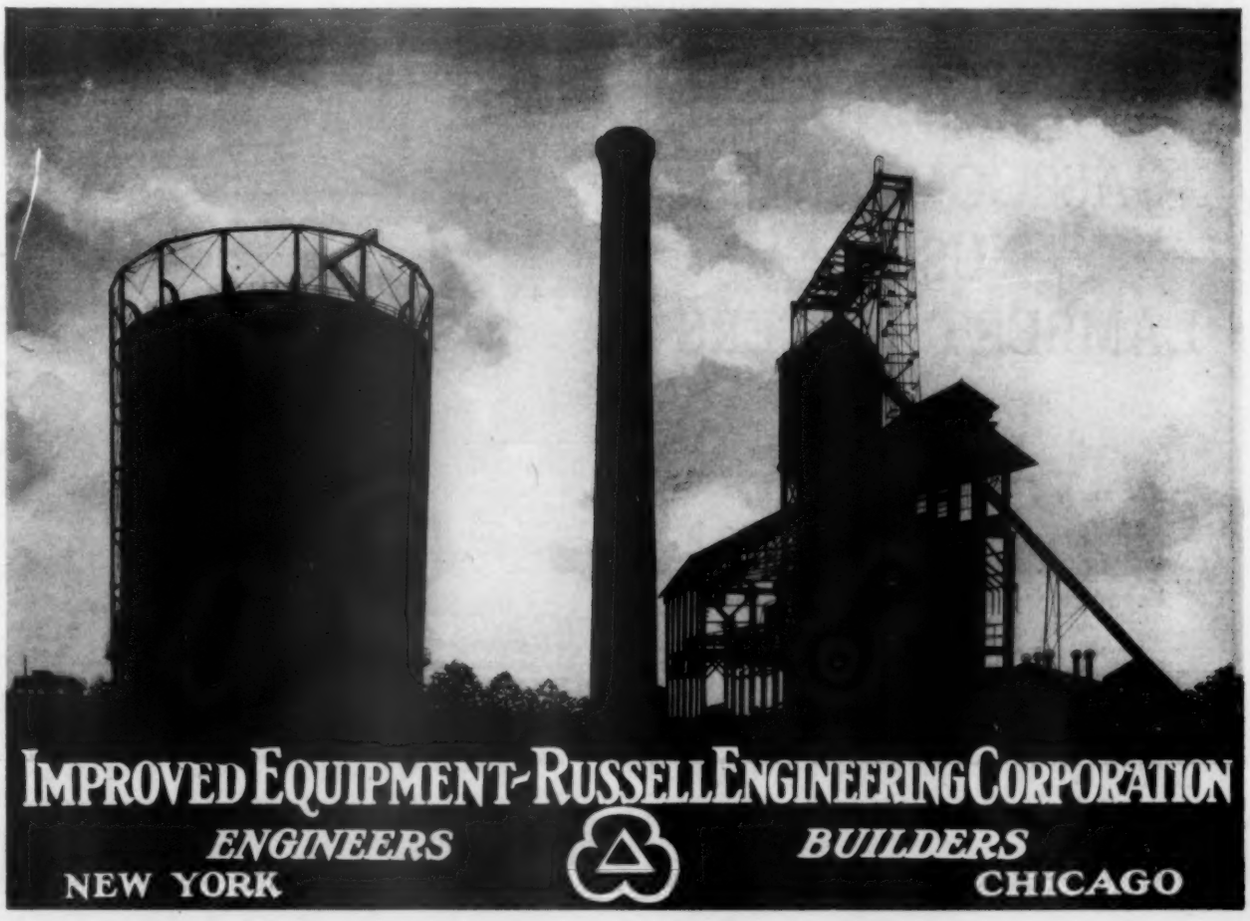

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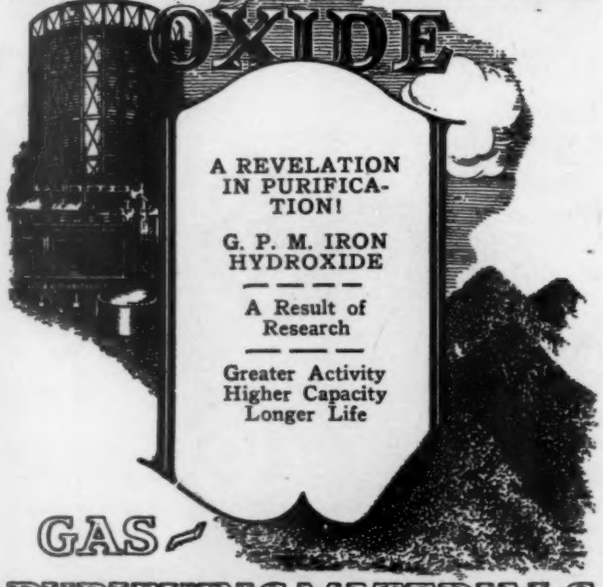

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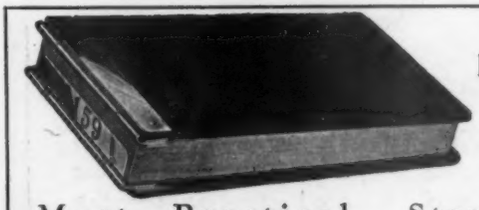

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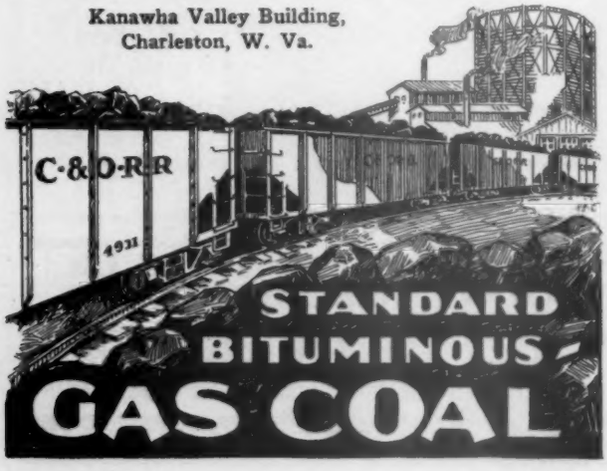

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